2017 RISE & BUILD Summer Workshops

Ian Davenport

1230 General Biology Lecture

&

Developmental Biology 3162

Last year I received a grant to

Re working Biology 1230 lecture

Giving 1230 a “facelift”

Progress Report

Details and goals

Objectives

- PowerPoints were issued around 2007, (3 editions ago).
- Use all the new images for the PP and to follow the book chapters more closely.
- Reintroduce Animal Development
- Reorganize some modules to follow the book.
- Reorganize the study guides and workbooks.
- Review and reorganize the online homeworks.
- Review and reorganize the LXR question bank.

Week of	Module #	Module title	chapter
Aug 23	IA & IB	A view of life & Chemical basis of Life	1 & 2
Aug 30	IB		
Sept 6	IC	Organic Compounds	3
Sept 13	IC		
Sept 20	IIA	Organization of the cell	4
Sept 27	IIB	Biological membranes	5
Oct 4	IIIA	Energy and Metabolism	7
Oct 11	IIA		
Oct 17	IIIB	How cells make ATP	8
Oct 25	IIIB		
Nov 1	IIIC	Photosynthesis	9
Nov 8	IIIC		
Nov 15	IVA	Chromosomes, mitosis and Meiosis	10
Nov 22	IVB	Animal Development	51
Nov 29			
Dec 6			

A view of life

Module IA.

- New module.
- But incorporates aspects from the old module IIB that did not fit (Characteristics of life and Biological Organization).

Completed

Chemical basis of life and organic compounds

Module IB & IC

- All images updated.
- Some of the math removed as they get that in Biol 1210 and Chem 1010.
- Will work with Ann and Mike to get electronegativity addressed with Atom structure in 1010.

Completed

Organization of the Cell

Module IIA

- Reworked with new images posted from the book.
- Have included the cytoskeleton.

Completed

Biological Membranes

Module II

- Reworked with new images posted from the book.
- Some of the math regarding solutions removed.
- Cell junctions introduced.

Completed

Energy and Metabolism

Module IIIA

- All images updated.
- Will address terminology: endergonic vs endothemic, exergonic vs exothermic to try to eliminate confusion.

- H = G + S
- H-enthalpy, G-free energy, S-entropy

Completed

How cells make ATP

Module IIIB

- All images updated.

Photosynthesis

Module IIIC

- All images updated.
- Engelmann`s experiment introduced.

Completed

Chromosomes, Mitosis & Meiosis

Module IVA

- All images updated.
- Introduce histones and nucleosomes in chromosome organization.

Completed

Animal Development

Module IVB

- New chapter.
- Will follow on from meiosis and gametogenesis through early development.
- Fertilization reaction.
- Cleavage.
- Gastrulation.
- Germ layers.
- Organogenesis.
- Extra embryonic membranes.

Completed

All:

- Workbooks
- Online homeworks
- Study guides
- Test banks

Have been reordered to follow the PP.

Continuous

Development and Growth

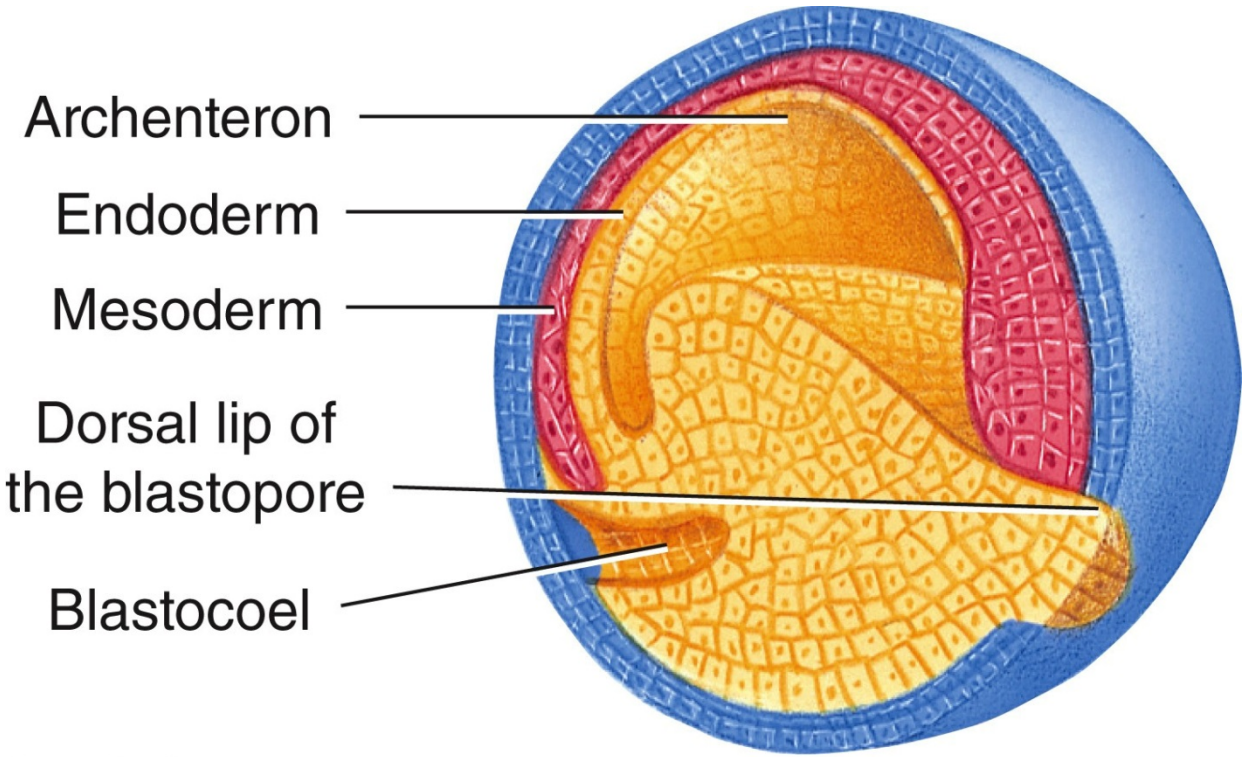
- Development includes all the changes that take place in an individual during its life

Development and Growth (cont'd.)

- Zygote divides by mitosis, forming an embryo
- In animals, growth occurs by an increase in the number of cells

Development and Growth (cont'd.)

- Cell determination, cell differentiation, pattern formation and morphogenesis contribute to the development of form

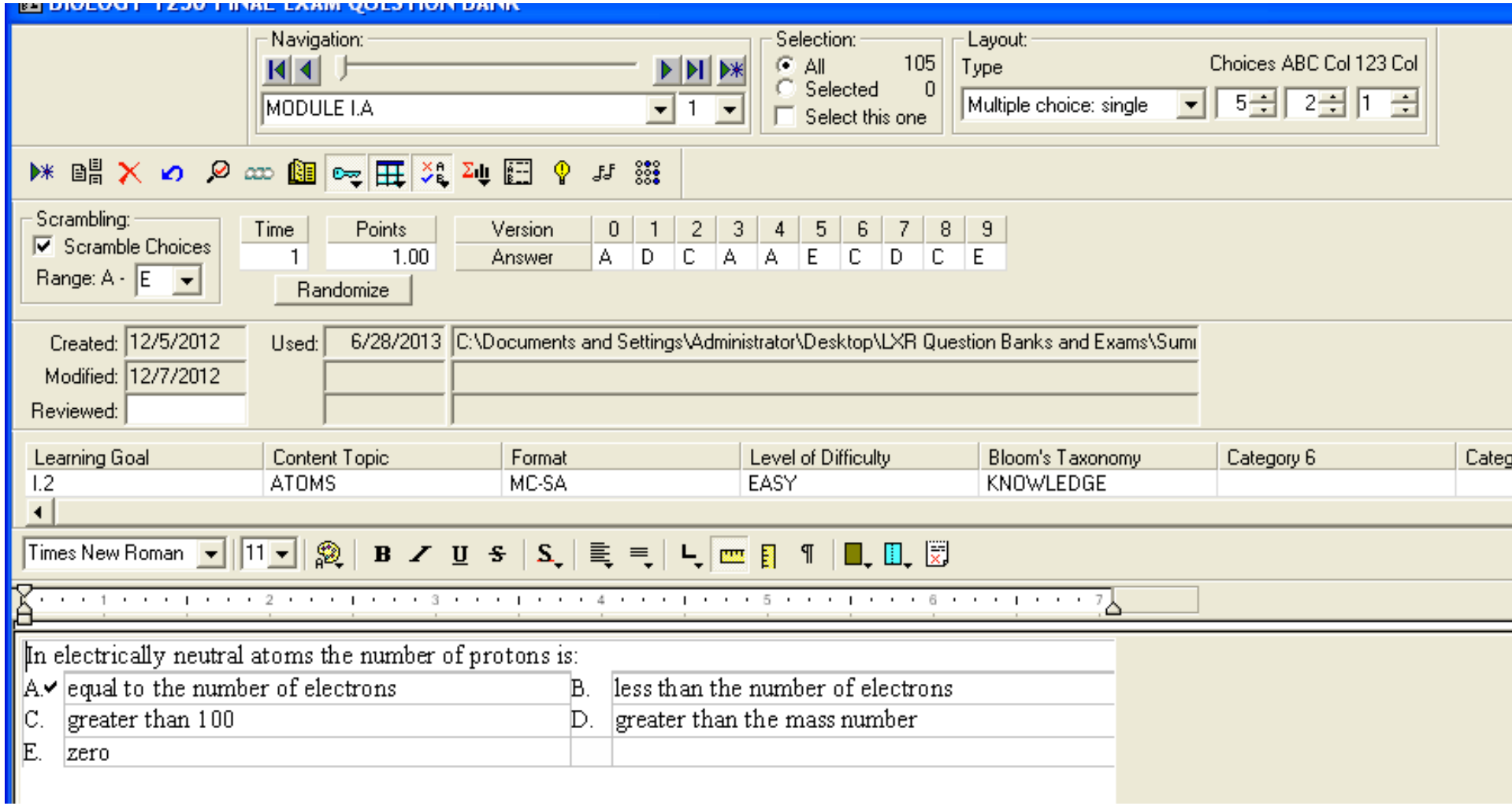


Assessment of reorganization

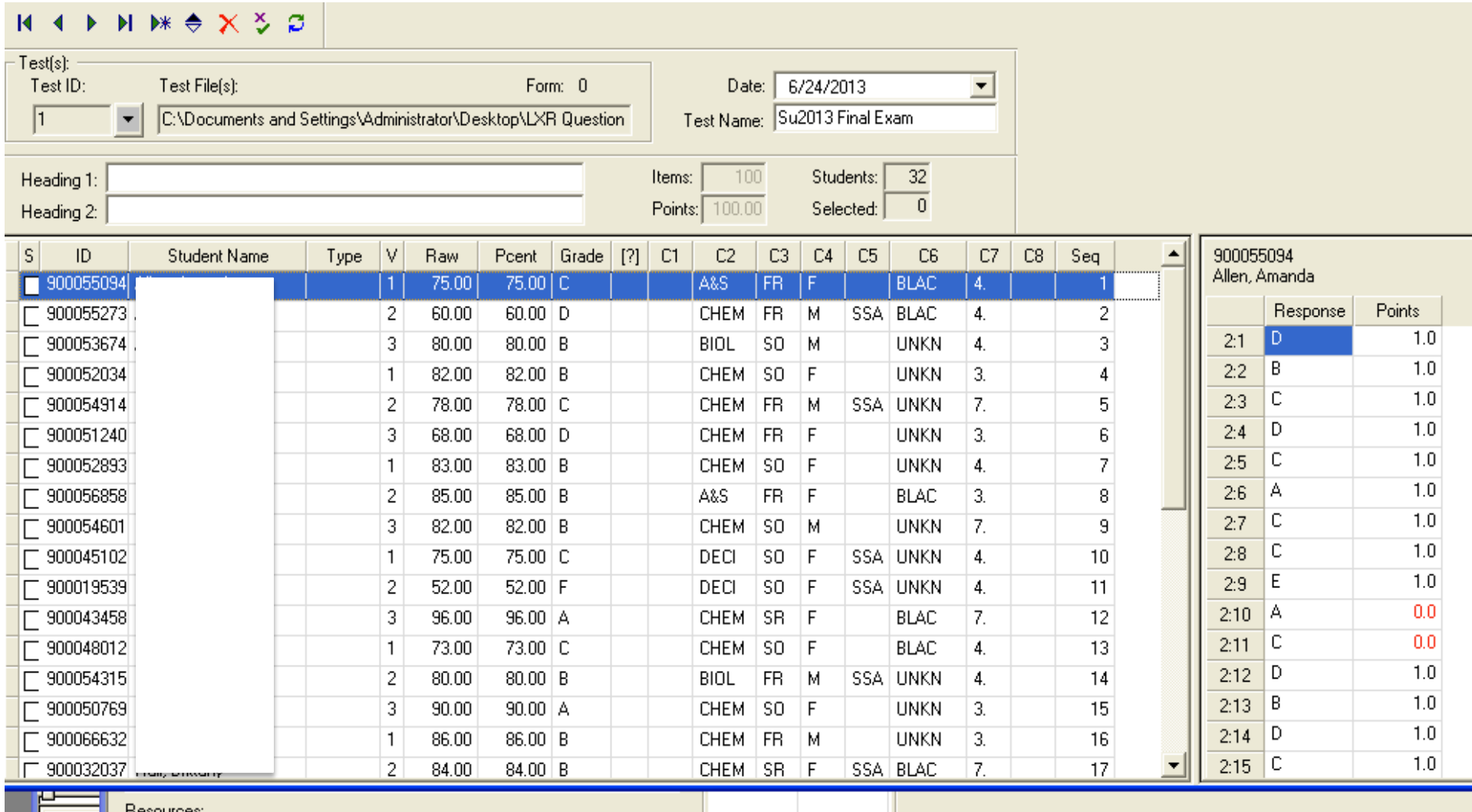
- All Powerpoints updated and new module added.
  Completed
- Teaching, get the course modules completed on time.
  Successful
- Allowing us to make sure exams are free of mistakes.
  Successful

Course assessment/Student assessment

LXRTEST



Individual students by ID



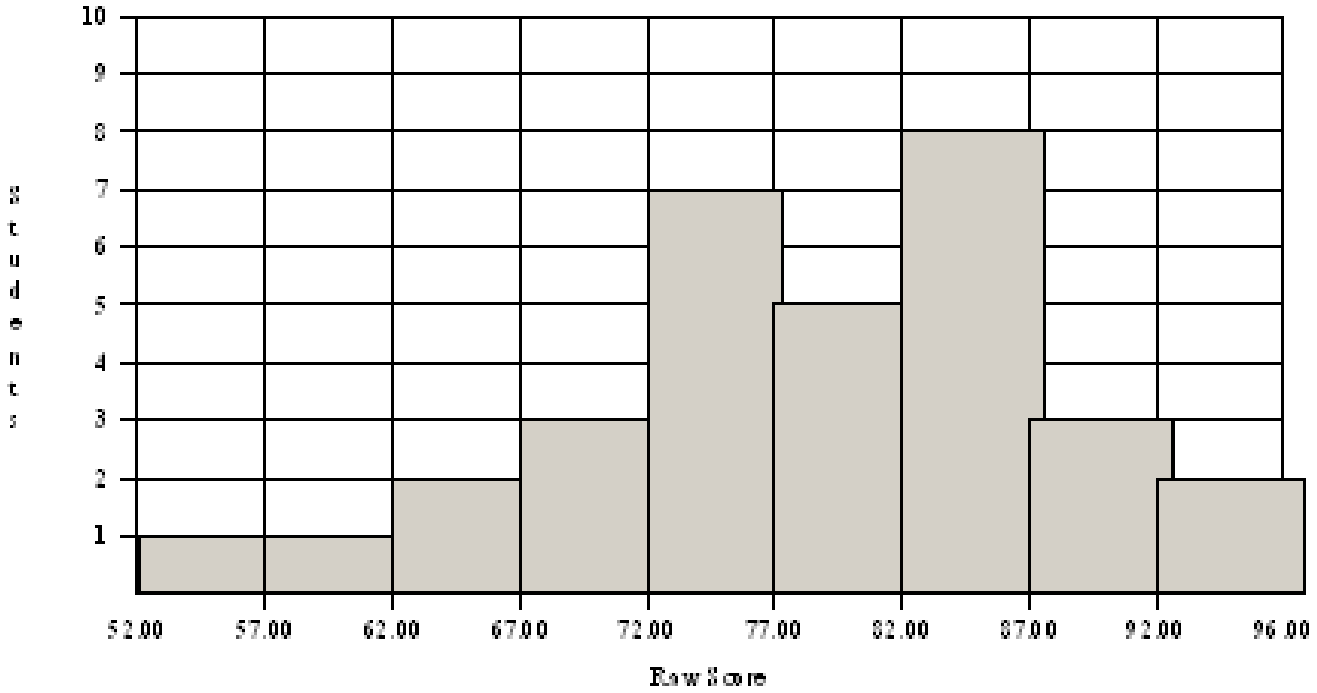
Test(s):
Test ID: 1
Test File(s): C:\Documents and Settings\Administrator\Desktop\LXR Question
Form: 0
Date: 6/24/2013
Test Name: Su2013 Final Exam
Heading 1:
Heading 2:
Items: 100
Points: 100.00
Students: 32
Selected: 0

S	ID	Student Name	Type	V	Raw	Pcent	Grade	[?]	C1	C2	C3	C4	C5	C6	C7	C8	Seq
	900055094	[redacted]		1	75.00	75.00	C			A&S	FR	F		BLAC	4.		1
	900055273			2	60.00	60.00	D			CHEM	FR	M	SSA	BLAC	4.		2
	900053674			3	80.00	80.00	B			BIOL	SO	M		UNKN	4.		3
	900052034			1	82.00	82.00	B			CHEM	SO	F		UNKN	3.		4
	900054914			2	78.00	78.00	C			CHEM	FR	M	SSA	UNKN	7.		5
	900051240			3	68.00	68.00	D			CHEM	FR	F		UNKN	3.		6
	900052893			1	83.00	83.00	B			CHEM	SO	F		UNKN	4.		7
	900056858			2	85.00	85.00	B			A&S	FR	F		BLAC	3.		8
	900054601			3	82.00	82.00	B			CHEM	SO	M		UNKN	7.		9
	900045102			1	75.00	75.00	C			DECI	SO	F	SSA	UNKN	4.		10
	900019539			2	52.00	52.00	F			DECI	SO	F	SSA	UNKN	4.		11
	900043458			3	96.00	96.00	A			CHEM	SR	F		BLAC	7.		12
	900048012			1	73.00	73.00	C			CHEM	SO	F		BLAC	4.		13
	900054315			2	80.00	80.00	B			BIOL	FR	M	SSA	UNKN	4.		14
	900050769			3	90.00	90.00	A			CHEM	SO	F		UNKN	3.		15
	900066632			1	86.00	86.00	B			CHEM	FR	M		UNKN	3.		16
	900032037	[redacted]		2	84.00	84.00	B			CHEM	SR	F	SSA	BLAC	7.		17

900055094
Allen, Amanda

	Response	Points
2:1	D	1.0
2:2	B	1.0
2:3	C	1.0
2:4	D	1.0
2:5	C	1.0
2:6	A	1.0
2:7	C	1.0
2:8	C	1.0
2:9	E	1.0
2:10	A	0.0
2:11	C	0.0
2:12	D	1.0
2:13	B	1.0
2:14	D	1.0
2:15	C	1.0

for Su2013 Final Exam from FINAL EXAM SCORES



Test Name:	Su2013 Final Exam	
Test Date:	6/24/2013	
Number of Examinees:	32	
Number of Items:	100	
Maximum Possible Points:	100.00	
Highest Score	96.00	(96.00)
Lowest Score	52.00	(52.00)
Median:	78.50	(78.50)
Mean:	77.50	(77.50)
Standard Deviation:	9.78	
Test Reliability:	0.86	
Standard Error of Measurement	3.67	

Number of students

Number of students who did not attempt an answer

Bold – Correct answer

Number of students that answered correctly

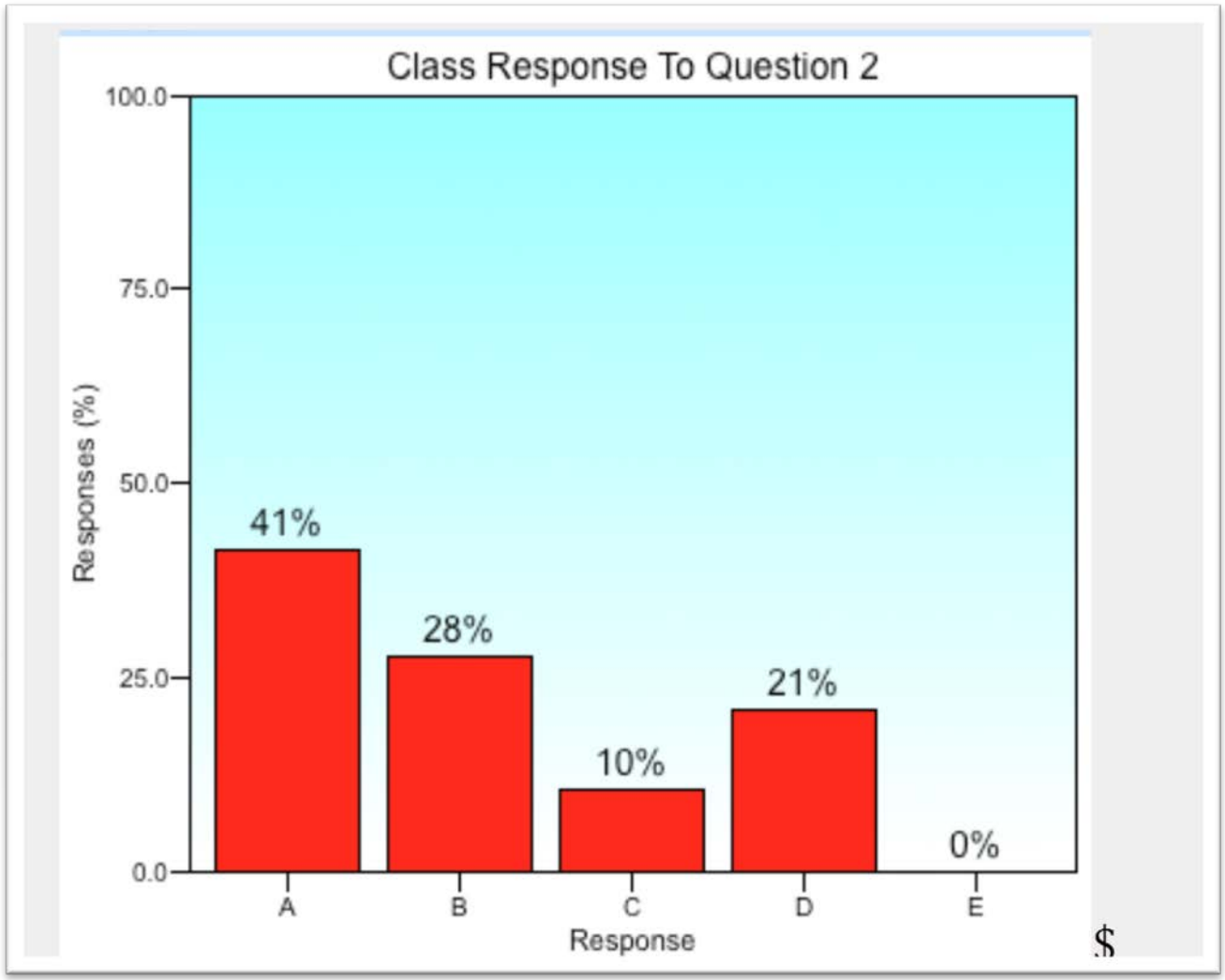
Point Bi-Serial

	Overall	Omits	A (True)	B (False)	C	D
Item	Admins					
Type	p					
Pts	Avg					
E.T.	rpb		A	B	C	D
MODULE5-PART1	104					
2:1	264	0	3	236	1	24
MCS	0.89	0.00	0.01	0.89	0.00	0.09
2.00	81.68	0.00	71.67	82.43	84.00	75.46
-	+0.235	-	-0.116	+0.235	+0.015	-0.213

Point Bi-Serial *(-1.00-1.00):* The point bi-serial measures the correlation between an Exam Taker's response on a given item and how the Exam Taker performed on the overall exam.

A point bi-serial that is greater than 0 indicates a positive correlation between the performance on the item and the performance on the exam. Students who did well on the exam also did well on this question and students who did poorly on the item did poorly on the exam. A point bi-serial closer to 1 indicates a very strong correlation. A negative point bi-serial score indicates a negative correlation between the two. Students that did well on the item did not do well on the exam and students who did not do well on the item did do well on the exam. This may be something to review. A point bi-serial close to 0 indicates that there was little correlation between the performance of this item and performance on the test as a whole. This may indicate that the question tested on material outside of the other learning outcomes assessed on the exam or that it was a mastery item where all or most of the class got the question correct.

In class several faculty use clickers.



Give out self-evaluation surveys multiple times a semester

This is a self-evaluation of study habits and exam preparedness. Your answers are confidential.

~The average number of hours I spent per week reading the chapters and/or reviewing/processing class notes was (circle the appropriate response):

zero to one one to two two to four greater than four

~I read the assignment before coming to class (circle the appropriate response):

never sometimes regularly

~I asked my instructor questions when I was confused about textbook material and/or lecture material (circle the appropriate response):

never sometimes regularly

~Overall, I spent 3 hours specifically studying for this exam (Please fill in the blank):

~Prior to taking the exam, I expected to get an approximate grade of (fill in the blank) B.

~My actual grade was a(n) (fill in the blank) C.

~Check all of the statements that apply to your performance on the exam:

- ✓ studied the right information
- ____ studied the right information but did not understand it
- ____ used the class outlines to study
- ____ did not know what to study
- ____ did not think I would need to know the information in such detail
- ____ did not study the right information
- ✓ studied the right information and thought I understood it
- ____ thought college would be easier
- ____ other _____

Analysis of Missed Questions

I answered the question incorrectly because:	**Insert question number below in the correct category**													
Did not study the information.	15	17	27	36	49	50								
Studied the information but forgot it														

Problems

Still time management issues.

Future plans

- May introduce new assessment software (parsystem–scantron, or examsoft)
- Keep updating the material across the board
- Improve question banks
- Implement new teaching strategies (flipping classrooms)

Re working Developmental Biology Lecture and Lab



Development, the most complicated fate a single cell can undergo.

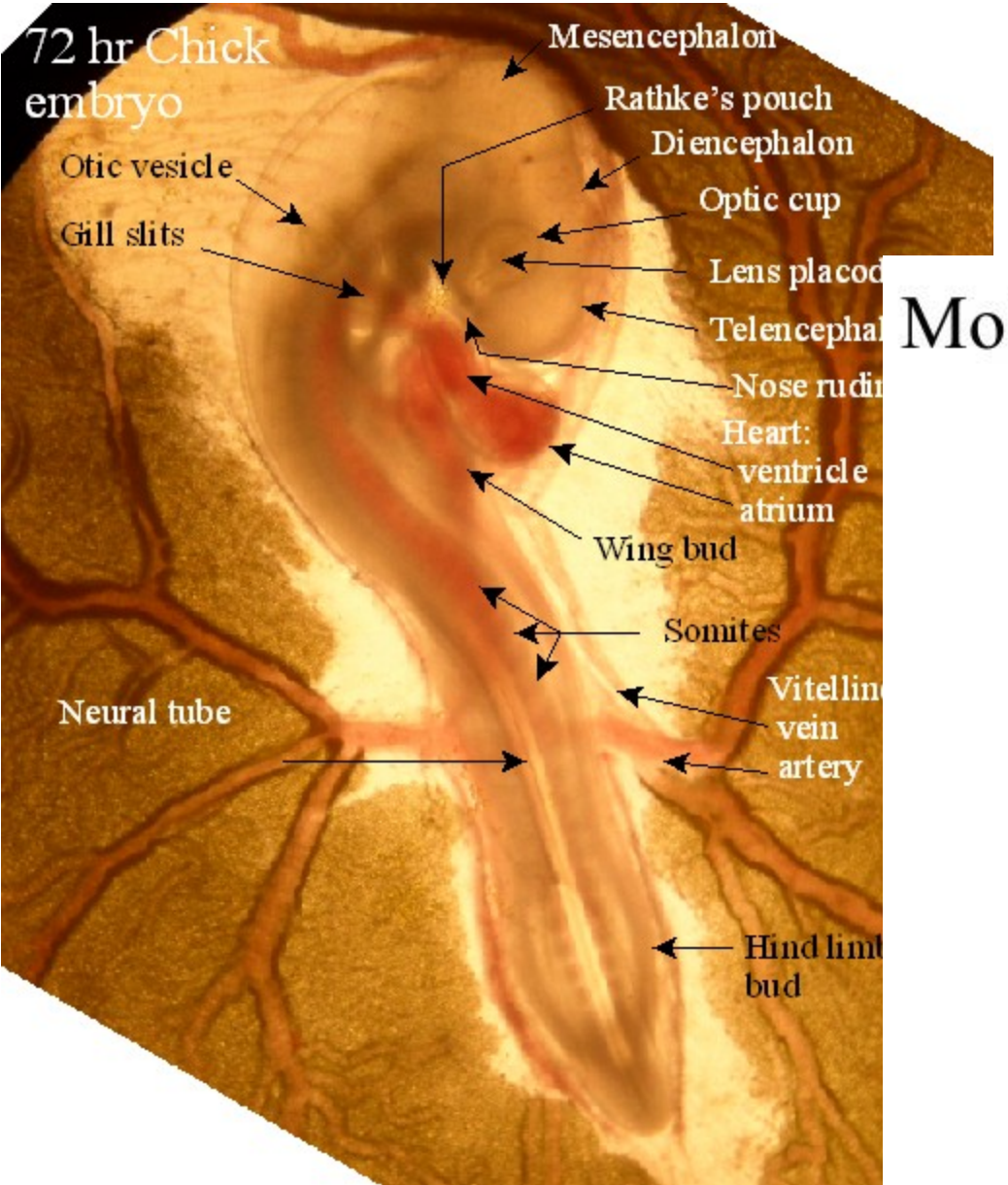
Rational

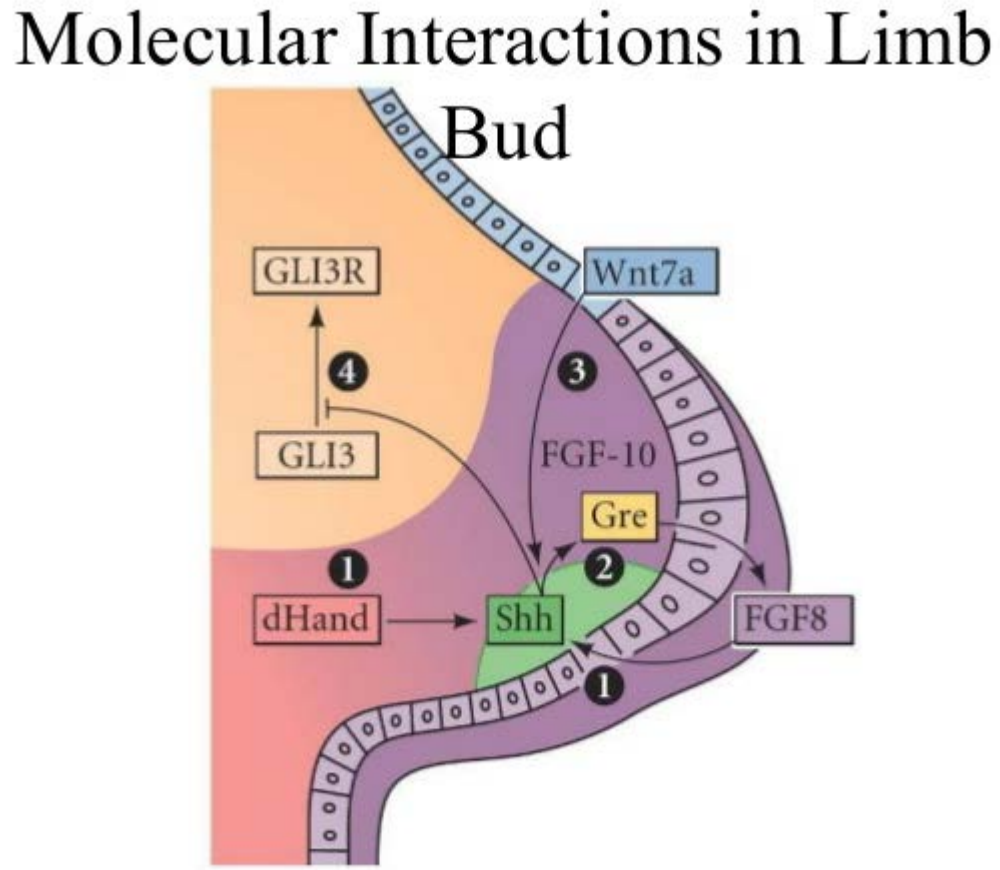
The Introduction to Embryology course (BIOL 3162) has not been updated in more than a decade. The purpose of this project is to rework the entire lecture component and restructure the laboratory section, bringing them in line with current thinking in the field of Developmental Biology.

In the 1970`s Developmental Biology began to change from morphology based to a more genetic approach:

Christiane Nusslein-Volhard
Edward B Lewis
Eric F. Wieschaus

Morphology i.e. what is looks like to why and how it becomes that way.





Details & Goals

- The course will teach Developmental Biology in a modern format and will introduce students to the topics of growth, aging, regeneration, and Evo-Devo.
- To do this I will Introduce a textbook “Principles of Development” Wolpert *et.al.*

- Bring an experimental component to the Laboratory in order to give students skills and experience in manipulating embryos.
- To do this I will introduce a Lab book “A photographic atlas of Developmental Biology” Shirley J. Wright.
- Introduce a series of experiments where students will examine embryos and make their own slides.

Progress Report
Lecture Syllabus

	week	Topic	Ch.
1	Jan 9th	Basic Concepts	1
2	Jan 16th	(Mon/MLK) Drosophila Development	2
3	Jan 23rd	Drosophila Development	2
4	Jan 30th	Vertebrate Life Cycles and Techniques	3
5	Feb 6th	Xenopus and Zebrafish	4
6	Feb 13th	Xenopus and Zebrafish & Exam 1	4
7	Feb 20th	Chick and Mouse	5
8	Feb 27th	Mardi Gras (whole week)	
9	Mar 6th	Morphogenesis	9
10	Mar 13th	Morphogenesis & Exam 2	9
11	Mar 20th	Germ Cells and Sexual Development	10
12	Mar 27th	Organogenesis	11
13	Apr 3rd	Nervous System Development	12
14	Apr 10th	Growth (Thur/Fri holiday)	13
15	Apr 17th	(Mon holiday) Evolution and Development	14
	Apr 24th	Evo-Devo and Exam 3.	
	May 1st	Monday last class	

Problems Encountered

I taught the lecture for the first time in Spring 2017

Many students struggled with:

- The depth of material (many are not familiar with basic cell biology).
- Many have had no introduction to very basic components of animal development.
- University level text books start beyond many of our students capabilities.
- Synthesizing information (putting together many individual concepts).

Addressing these issues:

- I have put Development back into 1230.
- I had to go back to very basic cell biology, cell signaling and genetics.
- I cut one of the chapters out, Germ Cells and Sexual Development.
- In future I will cover some of these areas in the lab environment.

Project success

Profile

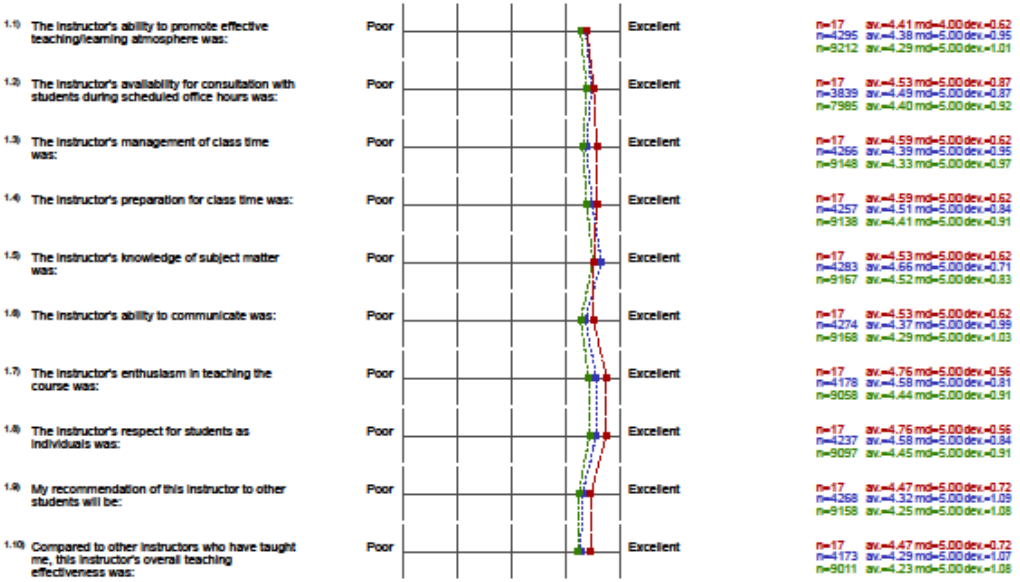
Subunit: College of Arts and Sciences
Name of the Instructor: Ian Davenport
Name of the course: (Name of the survey) Introduction to Embryology

Comparative line:
Compilation: SPRING 2017 CAS [College of Arts and Sciences]

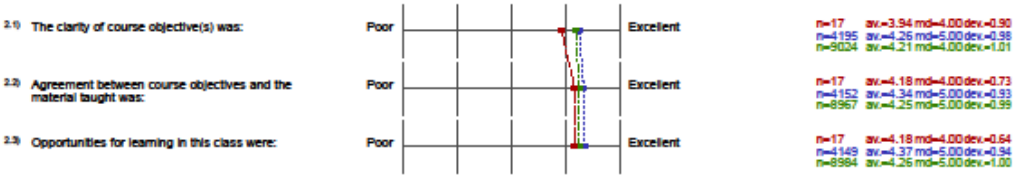
Comparative line:
Compilation: University - Spring 2017

Values used in the profile line: Mean

1. INSTRUCTOR EVALUATION



2. COURSE EVALUATION

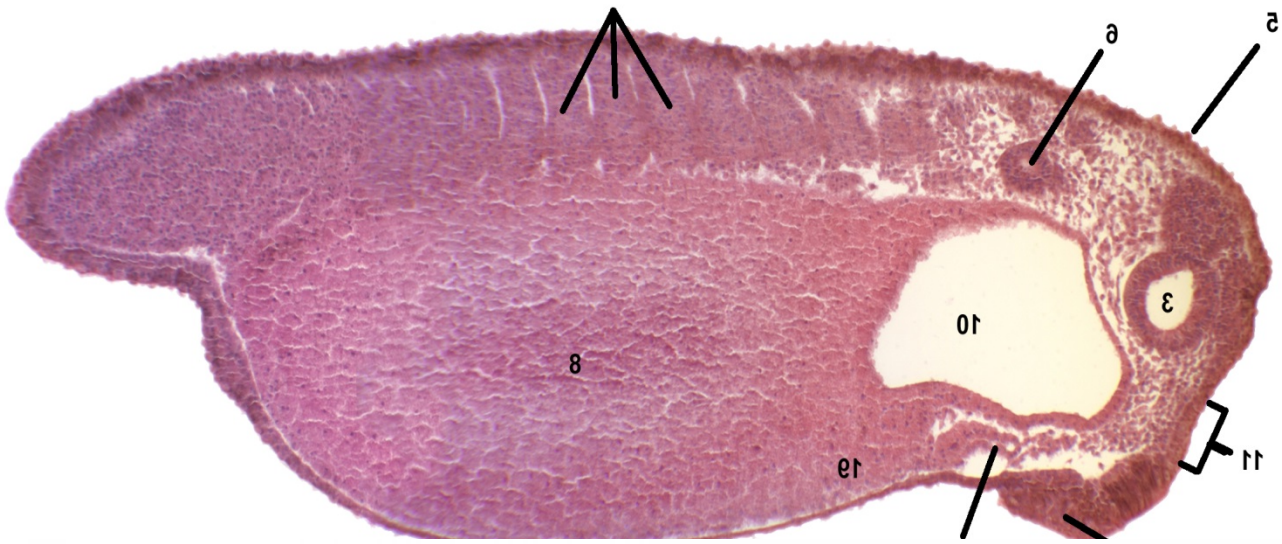


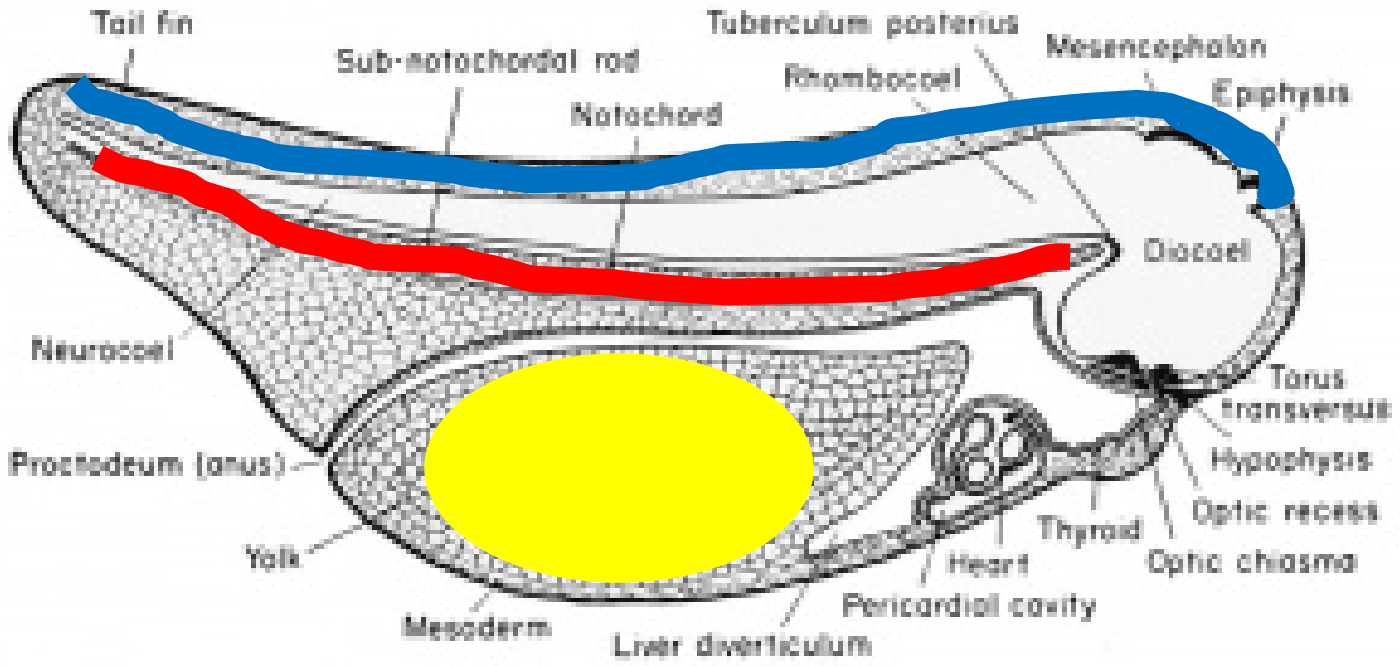
Developmental Biology Lab.

Project and Goals

- Bring an experimental component to the Laboratory in order to give students skills and experience in manipulating embryos.
- To do this I will introduce a Lab book “A photographic atlas of Developmental Biology” Shirley J. Wright.
- Introduce a series of experiments where students will examine embryos and make their own slides.

Previous lab was all slide based





First job.

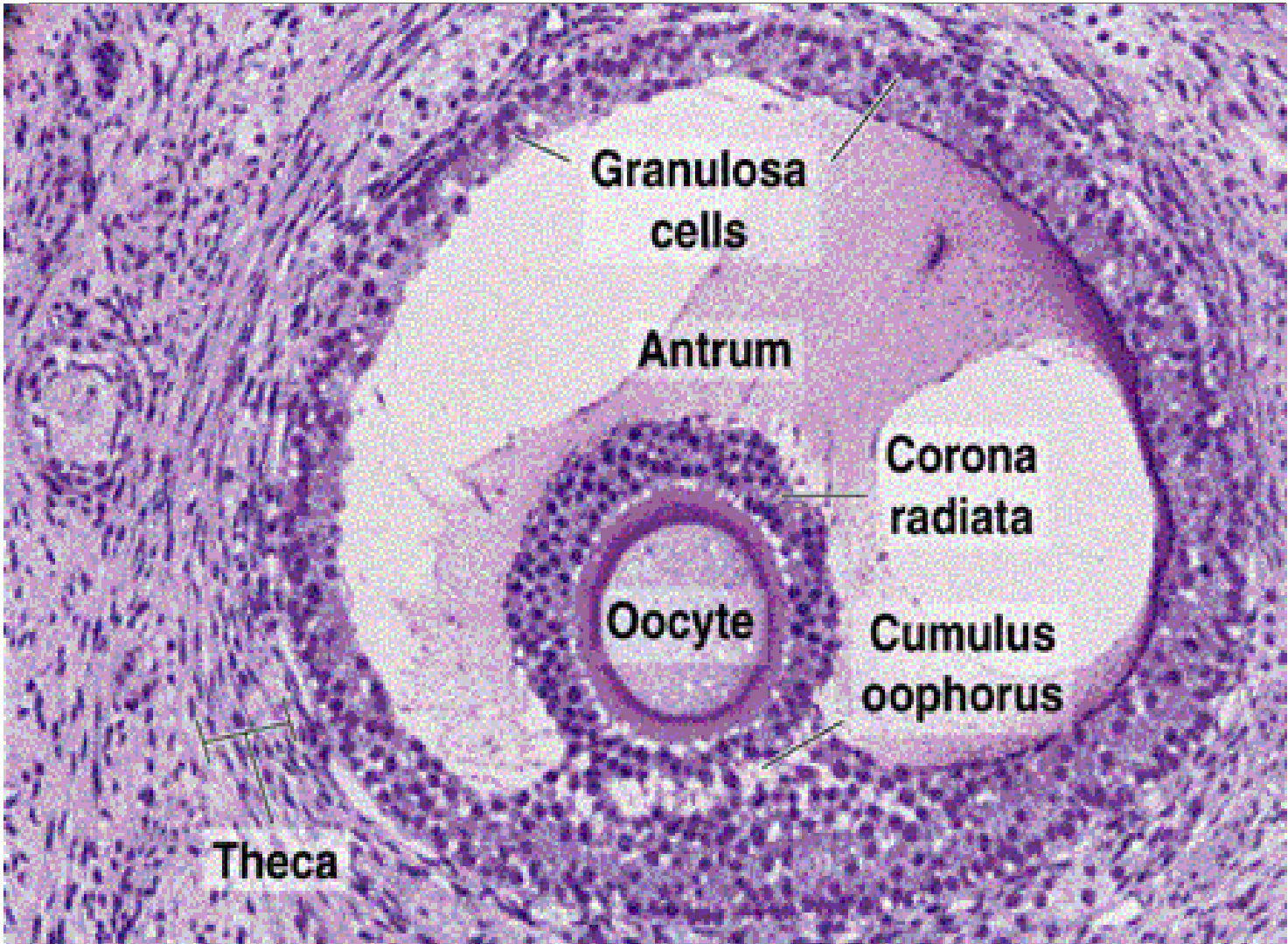
Sort out the slide boxes

25 slide boxes, approximately 80 slides per box (2000)

Check the boxes for slides and rearrange

New Labs: 1

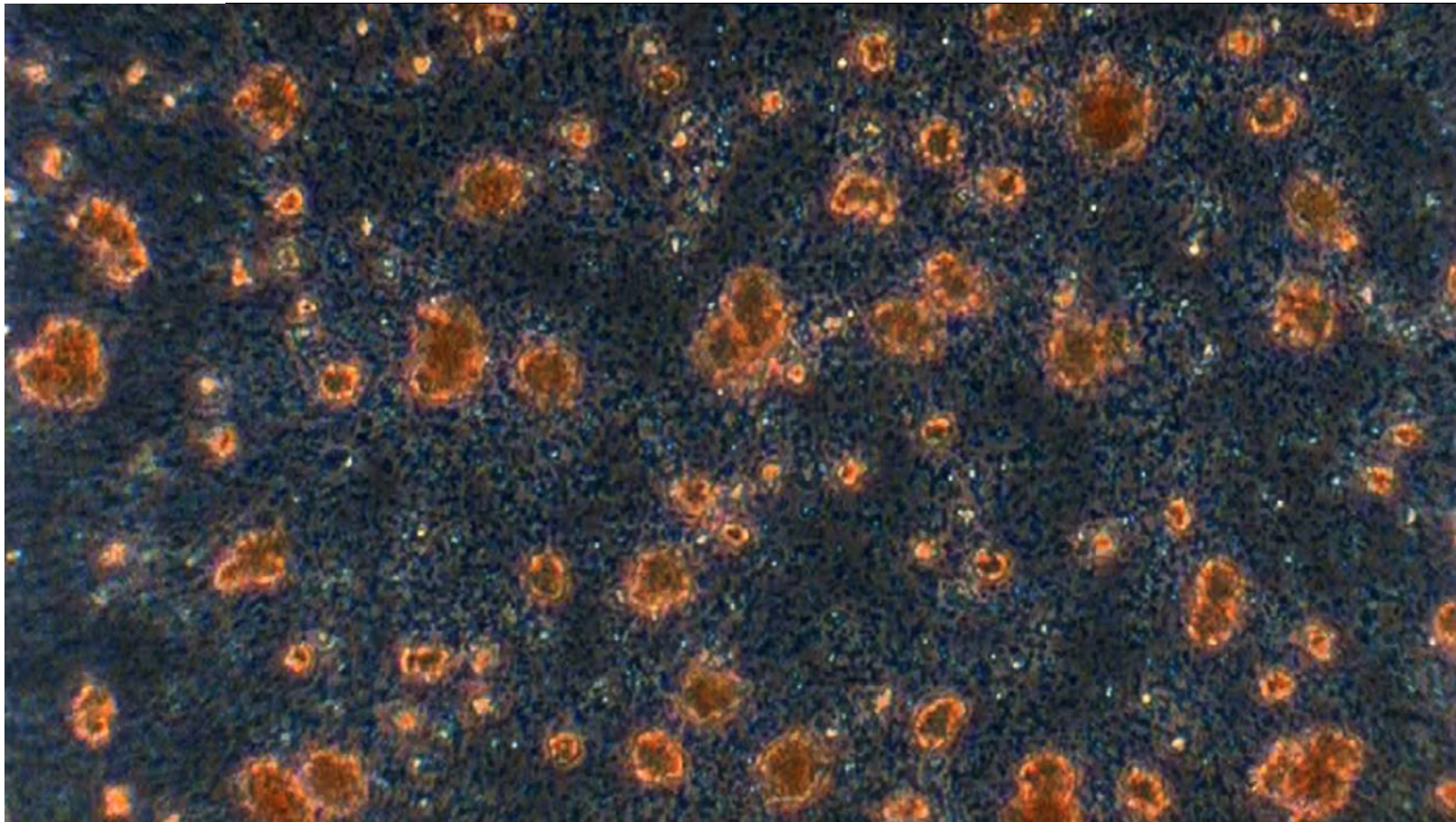
To address a lack of knowledge about gamete formation the first lab will focus on mammalian spermatogenesis and oogenesis.



Lab 2.

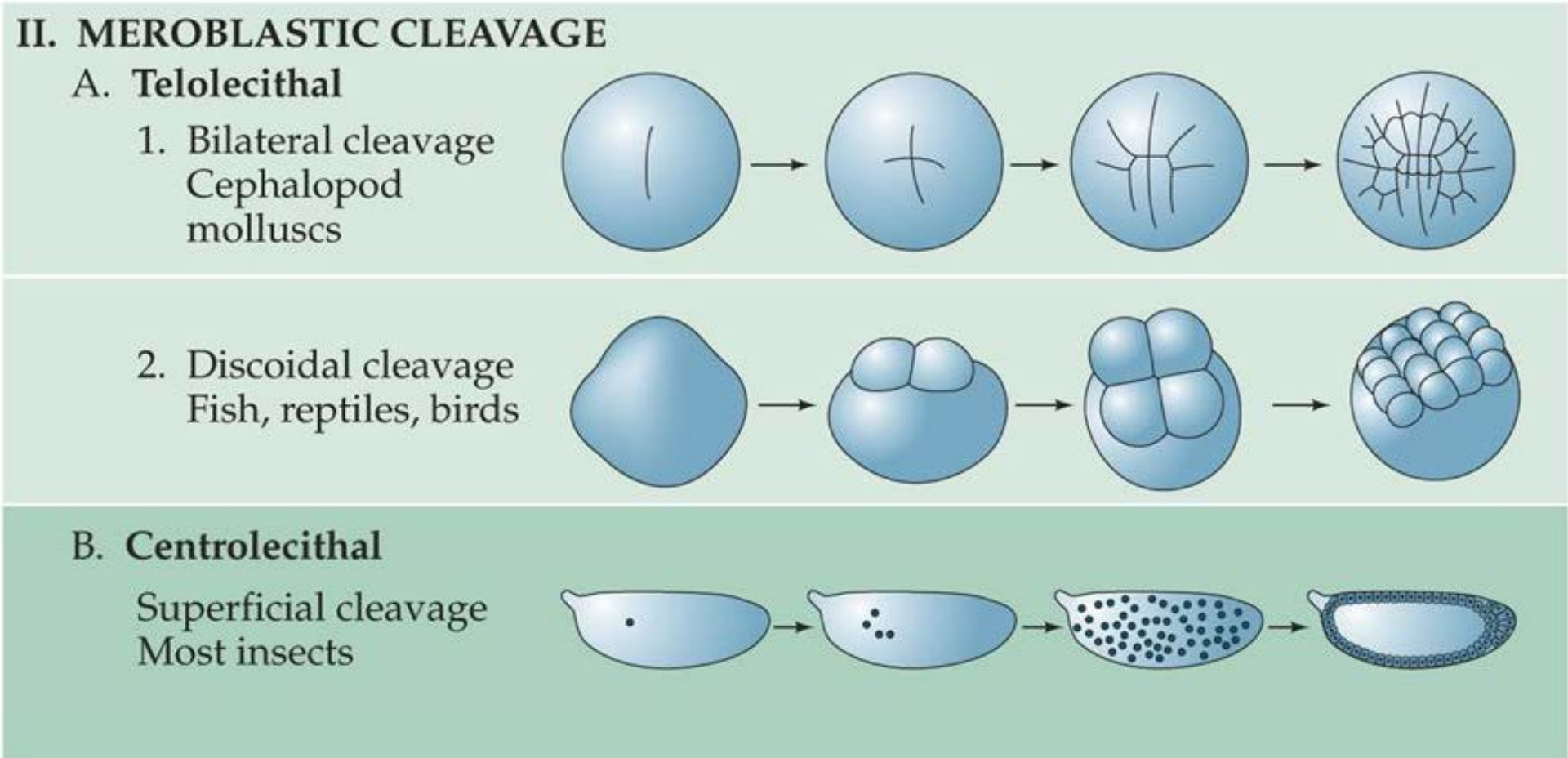
Sponge cell reaggreagation

- Introduce the concepts of how single celled organisms became mulitcellular.
- How cells are attached to each other (make and break).
- How cells recognize self vs non self.



Lab 3. Fertilization and Cleavage

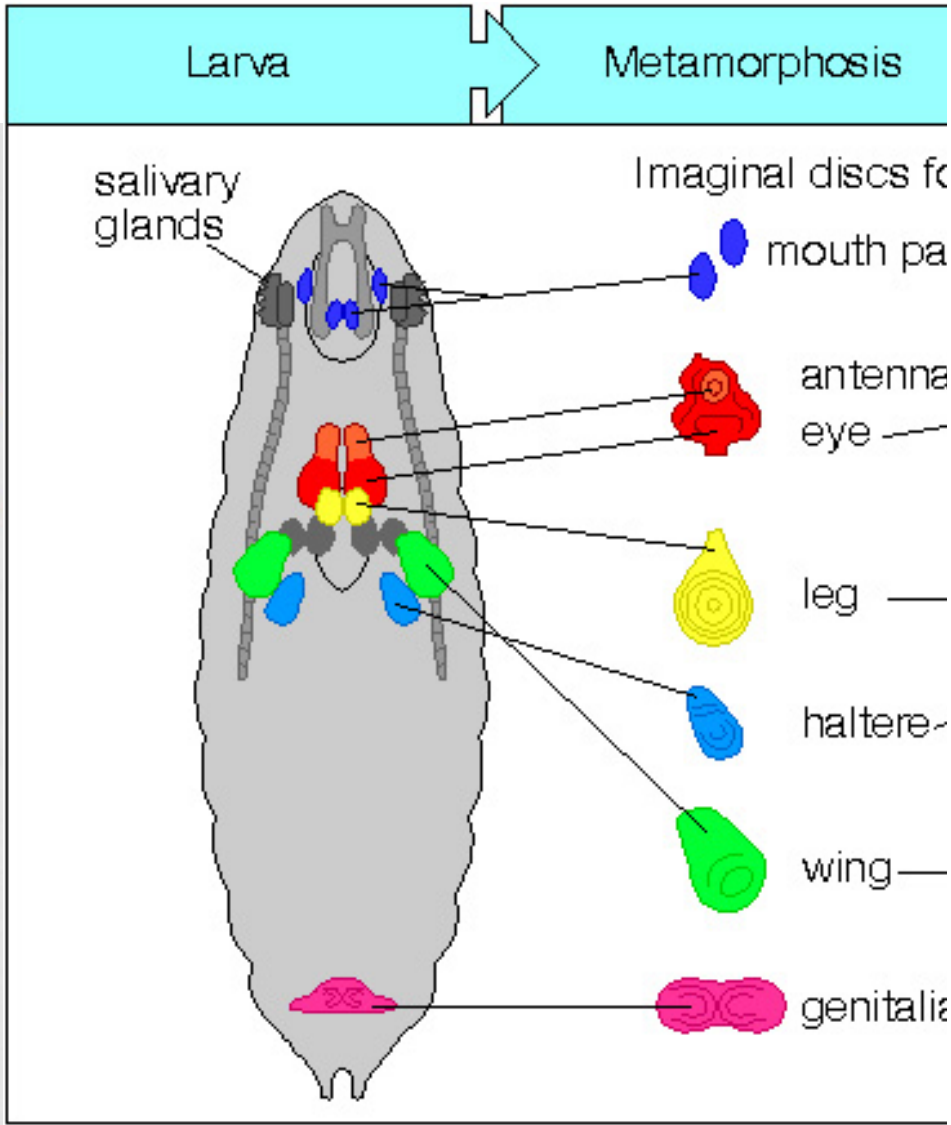
- Introduce the fertilization reaction.
- Cleavage patterns.
- Prepared material.

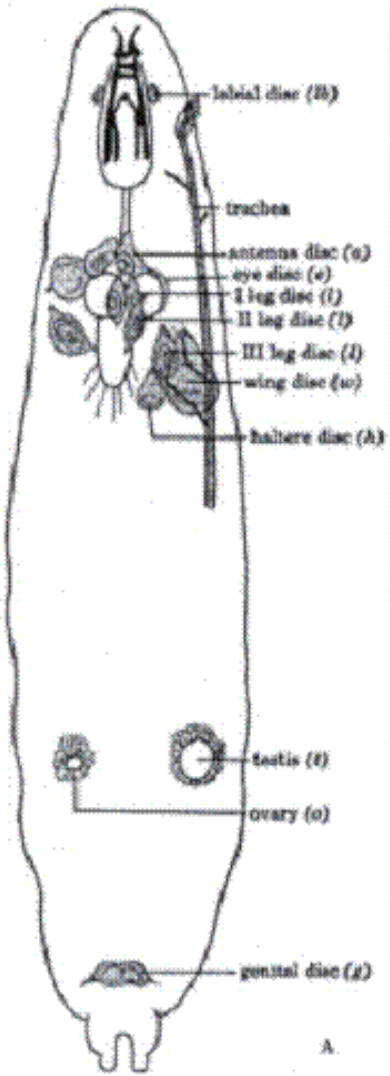


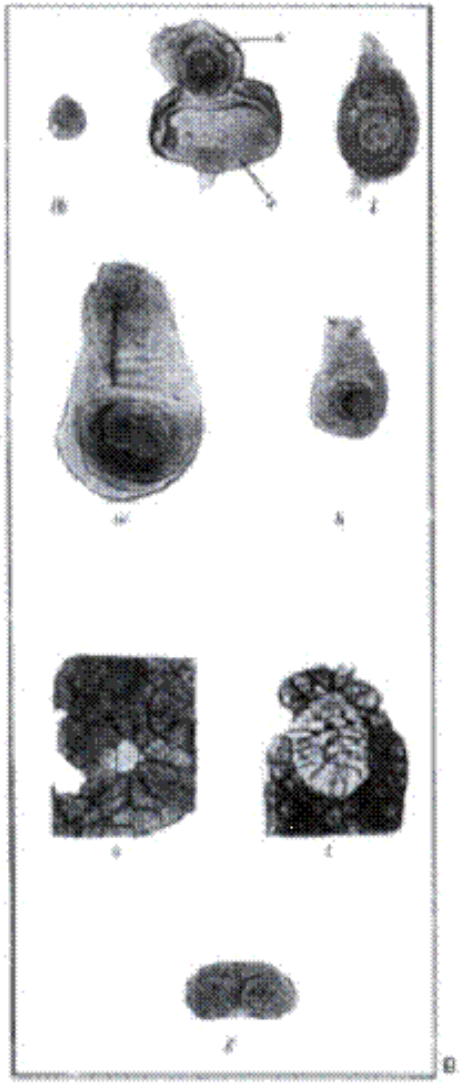
Lab 4.

Dissecting imaginal discs in *Drosophila.*

Experience in manipulating embryos.





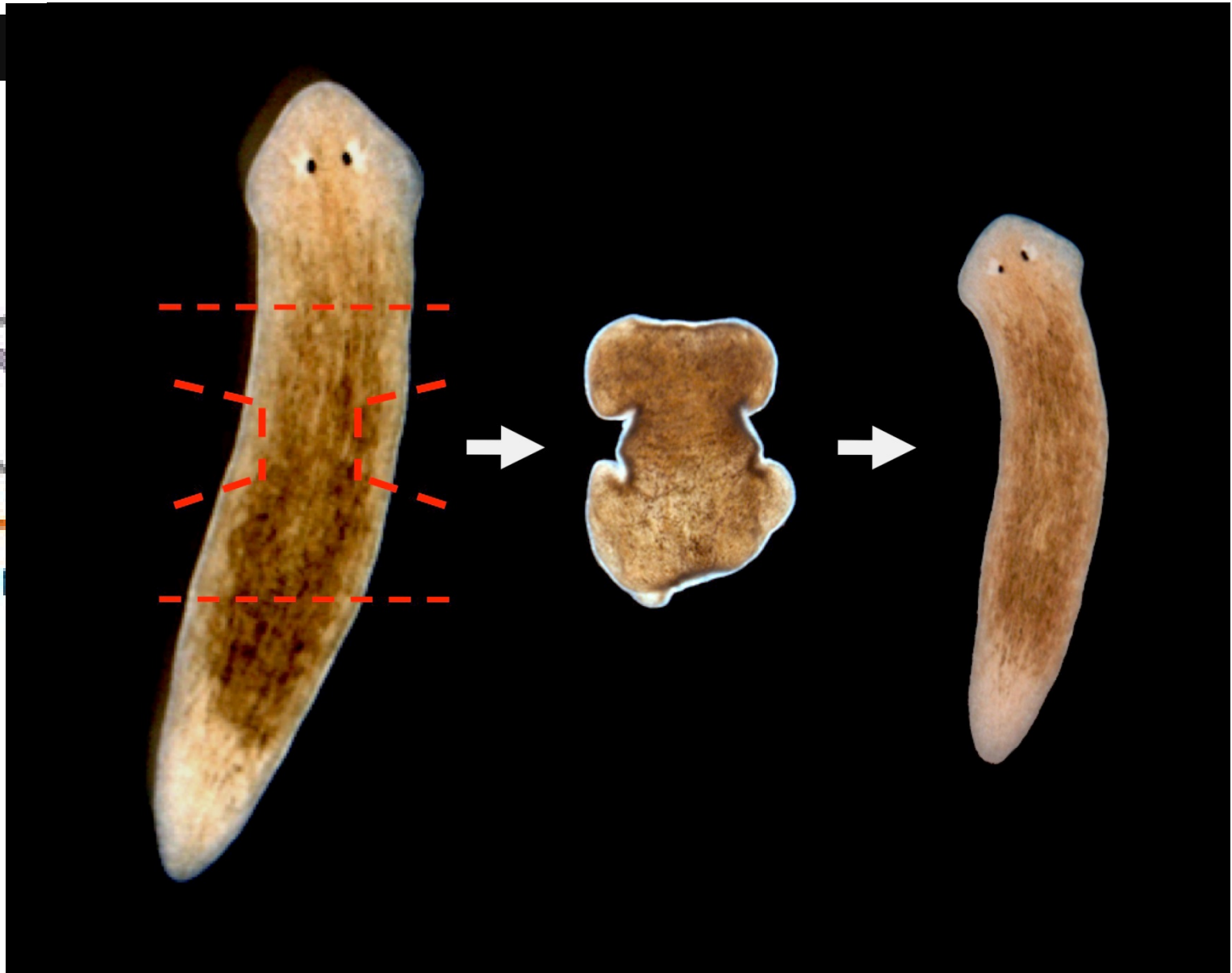


Lab 5

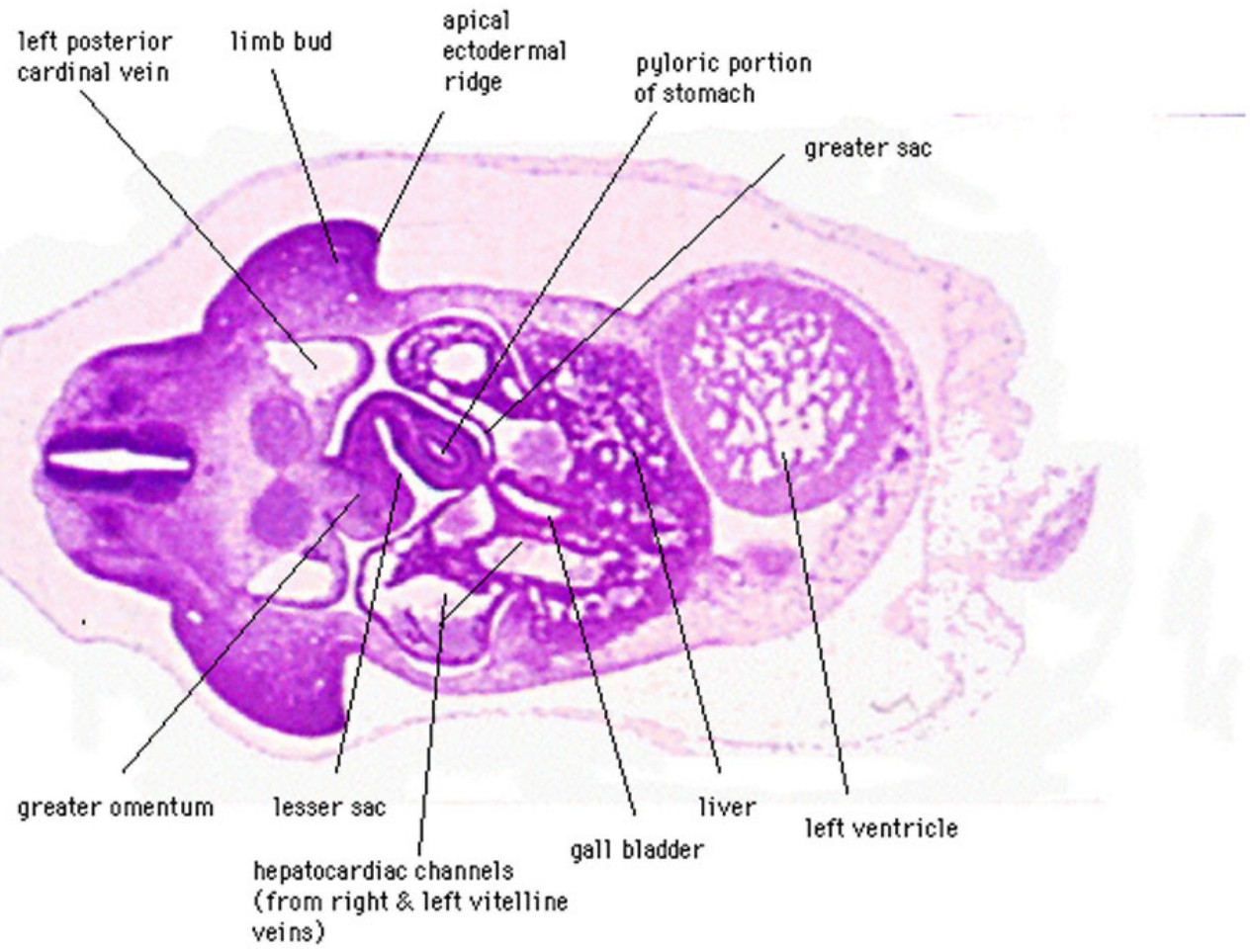
Chick development making whole mount slides.

Lab 9.

Regeneration in Hydra and Planaria.



The rest of the labs will be classical developmental stages of the frog and chick.



	week	Topic	Ch.
1	21st Aug	Intro to Basic Concepts, slide boxes, terminology & Gametogenesis	3&4
2	28th	Sponge cell reaggregation	
3	4th Sept	Fertilization, cleavage and developmental patterns	5&6
4	11th Sept	Drosophila Lab (staging embryos)	
5	18th Sept	Prac. Exam 1. Terms, gametogenesis, sponges, fert. & dev patterns Drosophila	
6	25th Sept	Chick 48 – 72 hour whole mount prep.	
7	2nd Oct	Early Frog development (grey cresent – 4 mm)	6-9
8	9th Oct	Frog development 5-7 mm	10
9	16th Oct	No Tuesday lab – review.	9
10	23rd Oct	Prac. Exam 2. chick slides & prep & Frog development	
11	30th Oct	Regeneration (hydra & planaria)Frog development 5-7 mm	
12	6th Nov	Chick reproductive system, cleavage paterrns & stages 18, 24, & 33 hour	6-9
13	13th Nov	Chick 48, 72 & 96 hour	11
14	20th Nov	Review - No Thursday Lab	
15	27th Nov	Prac. Exam 3. Regeneration & Chick Development	
	4th Dec		

Assessment

- Comparison of the ABC pass rate of the Embryology Course with that of both partially and fully developed Developmental Biology (including the first-time pass rate).
- Comparison of the mean class midterm and final GPAs of the three iterations of the course.
- Comparison of the withdrawal rate from each of the three iterations of the course.

- A self-assessment will be included as part of the new course offering, intended to capture the students' grasp of and confidence with the materials and techniques covered. Students will also be asked to assess how well they believe the new course meets its stated objectives.

To be continued

Re working Developmental Biology Lecture and Lab



From egg to Bruce