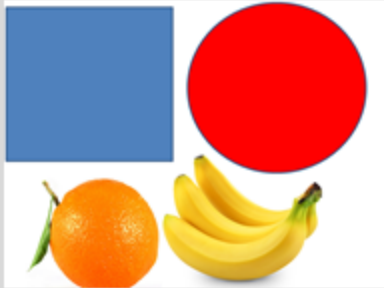


# FT S273 – FUNDAMENTALS OF FISHERIES BIOLOGY

Image © NORFANZ





## Untitled1

*Quiz - 6 questions*

Last Modified: Apr 23, 2014 at 02:05 PM

### PROPERTIES

On passing, 'Finish' button: [Goes to Next Slide](#)

On failing, 'Finish' button: [Goes to Next Slide](#)

Allow user to leave quiz: [After user has completed quiz](#)

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Show in menu as: [Multiple items](#)



Edit in Quizmaker



Edit Properties









*Worth* 1000.com

**Fundamentals of Fisheries Biology – FT S273**  
**Spring 2014**  
**University of Alaska Southeast Sitka**  
**3 Credit Lecture/ 1 Credit Lab**

**Class times/location**

Lecture: Monday 5:00 – 7:30 pm

Lab: Periodic distance meetings determined in class

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**Instructor:**

Reid Brewer

Room [101H](#), Sitka Campus

Ph: 907-747-7799

**Office hours:**

Monday 9 - 11

Wednesday 9 - 11

[Other days/times](#) by appt. or chance

Fax: (907) 747-7731

e-mail: [reid.brewer@uas.alaska.edu](mailto:reid.brewer@uas.alaska.edu)

Mailing address:

UAS Sitka|

1332 Seward Ave

Sitka, AK 99835

**Required text:**

[Moyle, Peter B. and Joseph J. Cech](#), 2004. Fishes: an introduction to ichthyology, 5<sup>th</sup> edition. [Pearson/Prentice Hall](#).

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**Course Description:**

The goal of this course is to introduce students to the diversity of fishes and their life in aqueous environments. Students will learn about evolution of fish, physical form and functioning of fish, fish habitats, behavior and ecology. The lab session will introduce students to identifying fishes using a dichotomous key (*The Fishes of Alaska*) and to internal and external characteristic of the three major groups of fishes. Lectures will be given using Elluminate Live with lectures recorded for asynchronous viewing. Students wishing to pursue a career as a field fisheries technician, hatchery technician, or fish biologist need a sound understanding of the biological functioning of fishes. This course is required for students in the Fisheries Technology Certificate and AAS programs.

**UAS Competencies:**

This course will address the following UAS competencies:

- Competency in Critical Thinking: Students in this class will be required to apply critical thinking skills to understand the functioning of fish in aqueous environments and to understand how they have adapted to this environment and function in it.
- Competency in Quantitative Skills: Students in this class will apply quantitative skills to the study of fish. Examples include measuring fish growth and determining age; quantifying water quality and habitat parameters of fish.
- Competency in Professional Behavior: Students in this class will be required to follow proper and safe procedures in the lab and field settings. Students will also be required to work as a team and help each other with lab exercises. These are professional behaviors for fisheries technicians.
- Competency in Communication: Students in this class will demonstrate communication skills in their fish presentation. They will also demonstrate group communication skills in lab projects involving team work.



## ✚ Lecture Schedule:

Date	Topic	Reading/Assignments
January 13	Introduction to Fish Bio Overview of class organization and expectations	Chapter 1
January 20	Martin Luther King Holiday	No class
January 27	Systematics/Evolution/Genetics	Chapter 12 Chapter 13 Watch assigned videos
February 3	Anatomy and movement	Chapter 2 Watch assigned videos
February 10	Respiration/Blood flow	Chapter 3 Watch assigned videos
February 17	<b>EXAM I</b>	

February 24	Balance/buoyancy/thermal regulation/ <u>Hydromineral balance</u>	Chapters 5 and 6 Watch assigned videos
March 3	Feeding	Chapter 7 Watch assigned videos
March 10	Growth and Reproduction	Chapter 8 and 9 Watch assigned videos
March 17	SPRING BREAK NO CLASS	
March 24	Sensory Perception and Behavior and Communication	Chapter 10 and 11 Watch assigned videos
March 31	<b>EXAM II</b>	

April 7	Intro to Fish Ecology	Chapter 27 Watch assigned videos
April 7	Invertebrate Biology and Ecology	To be determined
April 13 – 19	Lab sessions	
April 21	Student presentations Invertebrates continued	To be determined
April 28-May 2	<b>FINAL EXAMS</b>	<b>STUDY</b>

## Grading for Lecture and Lab:

3 exams:

First two exams worth 100 points each	200 points
Final exam worth 150 points	150 points
Fish presentation	100 points
Class attendance and participation	100 points
Lab exercises (8 at 25 points each)	200 points
Periodic quizzes (5 at 20 points each)	100 points
Homework assignments	100 points
Other assignments and participation	50 points
 Total	 1000 points

Final grades will be based upon below scale according to total points indicated above

	B+ 87-89%	C+ 77-79%	D+ 67-69%	F less than 60%
A 93-100%	B 83-86%	<u>C 73-76%</u>	D 63-66%	
A- 90-92%	B- 80-82%	C- 70-72%	D- 60-62%	

# EXAMS

- All exams will be closed-book proctored exams
- No study-guides will be provided so make sure you take notes
- The final exam will cover the entire course

# FISH PRESENTATION

- 15 minute .ppt presentation on a species specific fish issue (ex. ghost fishing impacts on spiny dogfish)
- 15 minute .ppt presentation on a regional issue that might impact local ecosystems (ex. climate change on subsistence communities in Prince of Wales)
- Other???

# LAB EXERCISES

- 8 lab exercises that will be done in Sitka and distance
- Materials will be sent in early January
- Labs will include dissections, using dichotomous keys, external anatomy comparisons, and others
- Students are encouraged to work in pairs with possible

## **SPECIFIC INFORMATION AND EXPECTATIONS**

Attendance is required and factors into the final course grade. If you are unable to attend class, please contact the instructor prior to class. It is the responsibility of the student to get information missed in class. All class lectures are archived in UAS online [homesite](#) for the class. We will go over finding these the first night of class.

Exams will be sent to pre-arranged proctors. Students residing in Sitka, Juneau and Ketchikan will take exams at UAS learning centers. I will give you the better part of a week to take the exams. It is the responsibility of each student to find an appropriate exam proctor. Please contact me early in the semester if you have questions about this. In rural areas, schools, libraries or places of employment have been used for this purpose. No notes, books or other resources are to be used in the exam room.

Students will be responsible for presenting a 20 minute Fish Presentation that will be due at the end of the semester. Requirements for this assignment will be posted separately online.

We will have several periodic quizzes and lab exercises during the semester. I will announce quizzes at the end of a class for the following week. Quizzes will always be at the end of lecture and will be done on-line. Quizzes will cover information covered the previous week to give students time to study. Students are expected to act responsibly in the lab and to follow all procedures carefully. Safety is important in the lab. Please report any broken equipment or materials or spilled chemicals promptly to the instructor. Many of the lab exercises will require students to work together. Team work and helping each other is looked upon favorably in this course. Lab exercises will be done the week of April 14-18<sup>th</sup>. Face to Face lab will be held in Sitka on the 14<sup>th</sup> and 15<sup>th</sup> of April.



### **The Most Important Study Tip: Aim to Understand Rather Than Memorize**

There will be many new terms and concepts that you will need to commit to memory. However, you will find the subject much less overwhelming if you focus on understanding the information rather than memorizing it. As we approach each new system, synthesize and build on the information you have previously learned.

### **Web Meetings**

Feel free to interrupt me at any time. Use the “raise your hand” function to be sure I see you. Off-topic chatting is distracting to everyone, so keep text messages on topic.

Elluminate sends all messages to the instructor, even if you send only to another student.

### **Time and Effort**

We have only three hours of scheduled meeting time per week, but this is an intensive 4 credit science lab course. Much of the coursework involves independent study and you should be prepared to work very hard. An average student can expect to put in about 12 hours of study per week, outside of scheduled meetings, to earn an average grade. I am here to help you learn and will do whatever I can to assist you.

### **Our Course Community**

Respectful communication is expected at all times. We may be separated by vast distances, but we are all in this course together. You will have many opportunities to work with classmates. Call or email us often. We are always glad to hear from you. I encourage you to get into the habit of contacting me (or using other help options) at least once a week to clear up questions.

## **Technology**

Expect to face some technology issues as part of getting your work done. Technology problems can be frustrating and time-consuming. Take control. Be a good shepherd of your time and your attitude. A good rule of thumb is to never spend more than about 15 minutes trying to resolve a technology problem on your own. Reach out for help using the numbers on the front page of the syllabus. If it is after hours, switch to a different task until you can reach technology help. If a deadline is looming, email to let me know of the issue. You will have an automatic extension (as long as it does not become habitual) while you work with technology help to resolve the issue.

Poor Internet access can put you at a disadvantage. Contact me to discuss the possibility of modifying assignments to accommodate connection problems.

## Help Resources

**Sitka Campus:** [sitka.distance@uas.alaska.edu](mailto:sitka.distance@uas.alaska.edu), 800-478-6653 or 907-747-7700 (x = phone extension)

- You can start here with questions about *any* aspect of our course, including technology.  
If we don't know the answer we will find someone who does
- eLearning Support: Kim x7709, Eric x7757, ~~Emy~~ x7721, Amy x7726, Randy x7701
- Writing Assistant: Jasmine Shaw x7717 [jdshaw@alaska.edu](mailto:jdshaw@alaska.edu)
- UAS Sitka Facebook and Twitter [www.uas.alaska.edu/sitka](http://www.uas.alaska.edu/sitka)

**UAS Technology Help Desk:** 877-465-6400, <http://www.uas.alaska.edu/helpdesk/>

### **Academic Honesty**

Academic integrity is expected at all times. **It is the student's responsibility to be familiar with the relevant sections in the UAS catalog and the UAS student handbook.** Academic dishonesty of any type, including plagiarism and inappropriate test conduct, will typically result in the most serious consequences provided for by UAS policy. Test misconduct or plagiarism of a written or image-based assignment (including Open Book Tests, Disease Team posts and Labs) will result in a zero for the assignment or a failing grade for the course. Students are required to view the presentation on avoiding plagiarism at our website before starting assignments.

### **Safety**

A Laboratory Safety Form must be signed and returned before beginning lab work. You will complete many laboratory activities during this class, some of which require simple safety precautions. Safety procedures are included in lab instructions. Do not use lab supplies until you have read my lab instructions for each unit.

**Important dates:**

1 <sup>st</sup> day of class	January 13
Alaska Civil Rights Day	January 20
Last day to withdraw from the class without a grade and 100% refund:	January 28
Last day to change from credit to audit or vice-versa	January 28
Spring Break	March 17-22
Last day to withdraw from class with a "W"	April 11
Finals week	April 28-May 3

- You joined the Main Room. ( 11:22 AM ) -

- Your chat permission has been enabled. ( 11:22 AM ) -

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File Edit View Tools Window Help

AUDIO & VIDEO



Talk

Video



New Page

Delete Page

PARTICIPANTS



Reid Brewer

Moderator



MAIN ROOM (1)



Reid Brewer

Moderator (You)




▼ CHAT - Supervised



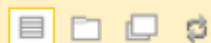
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- Your chat permission has been enabled. ( 11:22 AM ) -



 Room

 Moderators





Spring-2014  
FT273-TD1:  
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Discussions

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UAS Resources

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## Announcements

### Textbook information

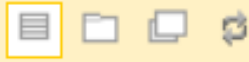
Posted on: Thursday, November 7, 2013

Students are responsible for ordering textbooks either through the UAS Sitka online book **provider of your choice**. Please order your books early to ensure they arrive prior to the book request form [http://www.uas.alaska.edu/sitka/support/bookstore\\_form.html](http://www.uas.alaska.edu/sitka/support/bookstore_form.html)

### The required textbook for this course are:



**Fishes : Introduction to Ichthyology**



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## Course Content



### 1. Introduction to FT S273



### 2. Systematics and Evolution

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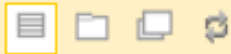
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- In this weeks module . . .**
- [Specific objecives](#)
- [Readings for this module](#)
- [Discussion Board](#)
- [Eluminate Live](#)
- [Final note before this class pe](#)



## In this weeks module . . .

Welcome to FT S273 Fundamentals of Fisheries Biology. In this first module we will be talking about course expectations. We will also discuss your current knowledge of fisheries. As you know, we might even get to talking a little bit about fish. Each module will have specific objectives and then reading assignments or things that need to be covered.



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-  **[Specific objectives](#)**
-  [Readings for this module](#)
-  [Discussion Board](#)
-  [Eluminate Live](#)
-  [Final note before this class pe](#)



## Specific objectives [Click](#)

### [Click to Launch](#)

By the end of this module you will:

1. know your instructor and fellow students
2. understand the expectations and requirements
3. understand how to use all of the distance learning tools
4. learn about the basics of fish biology as it applies to the industry

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## Discussion Board

Forums are made up of individual discussion threads that can be organized around a pa

Create Forum

	Delete		Forum	Description
↕	<input type="checkbox"/>		<a href="#">1. General class questions</a>	We will be using the discussion forum from time to time for questions about assignments, projects, labs, etc. I will check in to see what others are asking, who knows your questions...
↕	<input type="checkbox"/>		<a href="#">Discussion Board check in</a>	To ensure that each of you understands how to use this forum, I will have a "check in" where you can tell me how you think fish are cool because . . ."
↕	<input type="checkbox"/>		<a href="#">Evolution and Form</a>	Your second assignment will be to look at what your classmates and colleagues work. For this assignment I want you to look at the "cool." Thinking about the fact that these two bottom fish have similar features (cod) compared to fish B (sturgeon)

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## Forum: Evolution and Form

Organize Forum Threads on this page and apply settings to several or all threads. Threads are listed in a

Create Thread


<input type="checkbox"/>	<input type="checkbox"/>	<u>Date</u>	<u>Thread</u>
<input type="checkbox"/>	<input type="checkbox"/>	11/19/13 11:35 AM	<a href="#">Compare and contrast</a> ▾

[Compare and contrast](#) [Reply](#)

**Total Posts: 1 Unread Posts: 0**

Message Actions

Select: [All](#) [None](#)

 [Compare and contrast](#) Reid Brewer

Select: [All](#) [None](#)


Message Actions

[< Compare and contrast >](#)

**Author:** Reid Brewer  
**Posted Date:** Tuesday, November 19, 2013 11:35:46 AM AKST  
**Edited Date:** Tuesday, November 19, 2013 11:35:46 AM AKST

**Total views:** 6 (Your views: 6)

Advantages and disadvantages comparing fish A and fish B

 [fish.png](#) (168.451 KB)

[< Compare and contrast >](#)



A. Pacific cod



B. Sturgeon



# **INTRODUCTION TO FISHES AND THE STUDY OF FISHES**

---

FT 273 Fundamentals of Fisheries  
Biology



# WHAT'S IN A NAME?


- humuhumu-nukunuku-ä-pua‘a
- *Rhinecanthus rectangulus*
- Reef triggerfish

# fish “definition” (artificial):

 ‘cold-blooded’ (poikilotherm)

 vertebrate ((noto)chordate)

 aquatic (reproduction)

 respiration (internal ‘gills’)

 (paired) fin or fin-like limbs

 usually have scales or  
modifications of them

 lateral line

# FISH ARE DIVERSE

- Live in diverse habitats
- Have different body shapes
- Have different body structures
- Have different reproductive strategies
- Have different feeding styles
- Inhabit multiple niches in life cycle



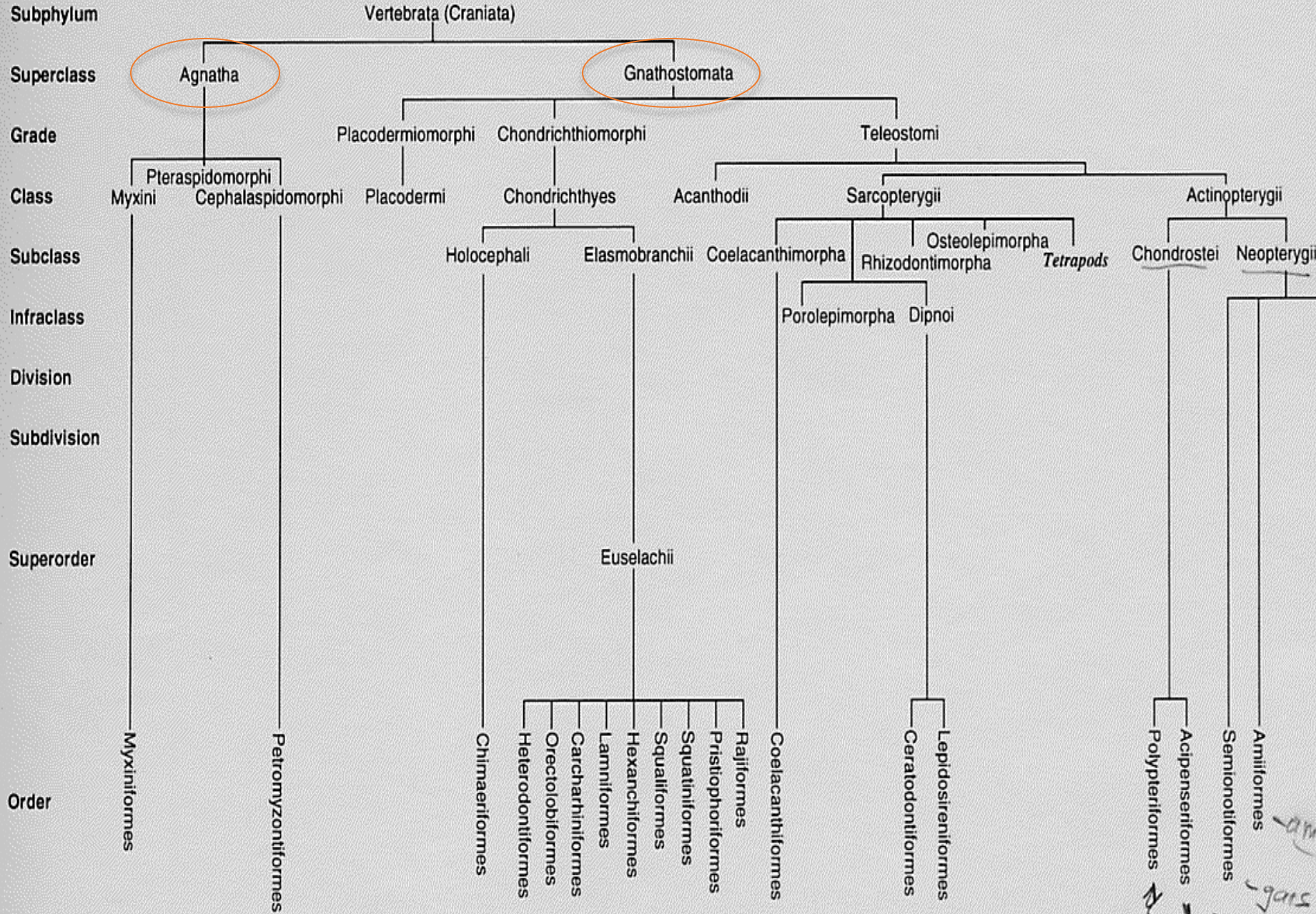
Image: G. McNeil

# FISH ARE DIVERSE



CATEGORY

# HIERARCHY OF HIGHER CATEGORIES OF FISHES





# ANCESTRAL VERTEBRATE

branchial skeleton external to gills  
notochordal support for swimming  
single nostral, single median fin

cartilagenous cranial elements, no jaws,  
1 semicircular canal

HAGFISHES

LAMPREYS

extensive dermal bone in skeleton, heterocercal tail,  
branchial skeleton internal to gills, jaws, paired fins,  
paired nostrils, 3 semicircular canals

PLACODERMS

secondary loss of dermal  
bone, urea retention for  
osmotic balance, shelled egg or  
live birth, notochord constricted  
by cartilagenous vertebral centra

RAYS

gas bladder outpocketing from esophagus  
fins more free to move

SHARKS

CHIMAERAS

gas bladder specialized for oxygen exchange

LUNGFISH

gas bladder is generalized for  
buoyancy and oxygen exchange

PADDLEFISH

TETRAPODS

BICHIR

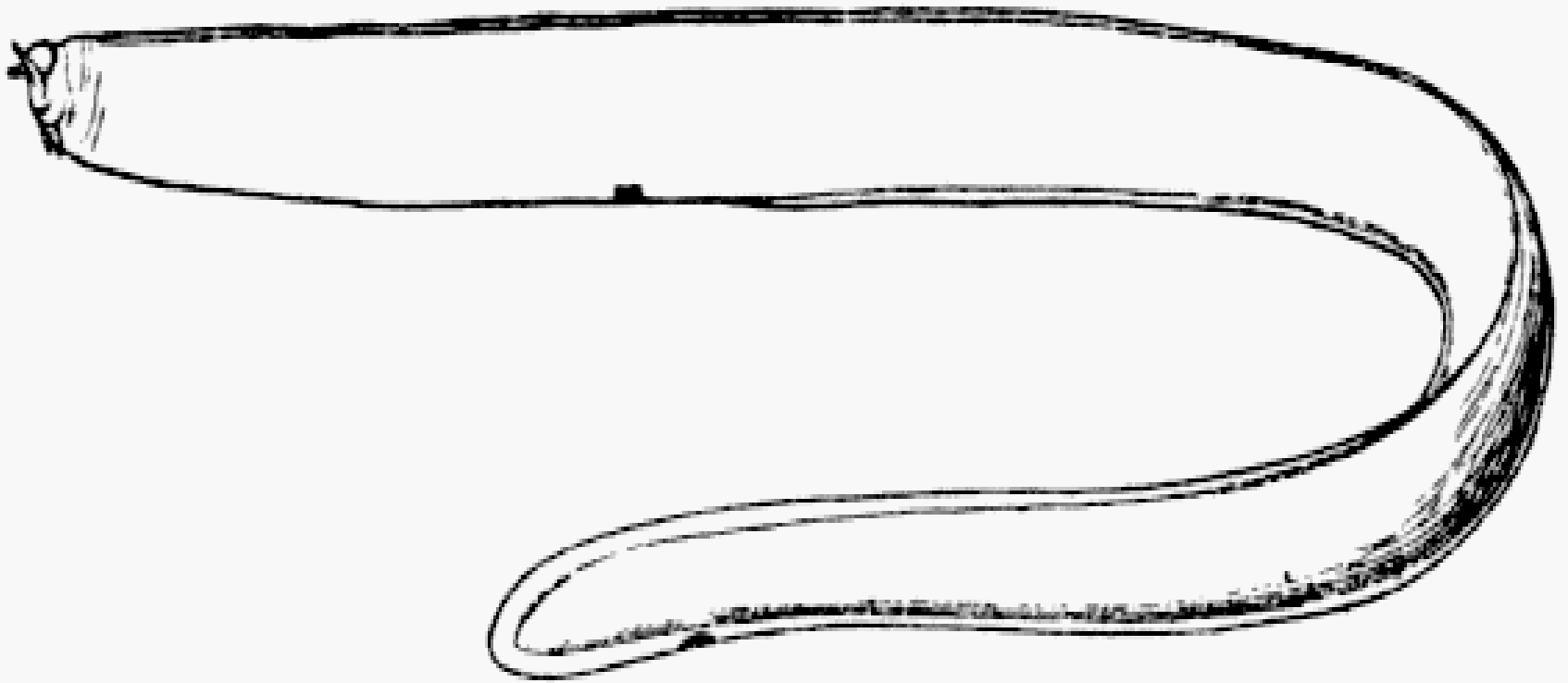
notochord replaced by centra  
maxilla and premaxilla present  
terminal mouth

STURGEONS

GARS

TELEOSTS

BOWFINS

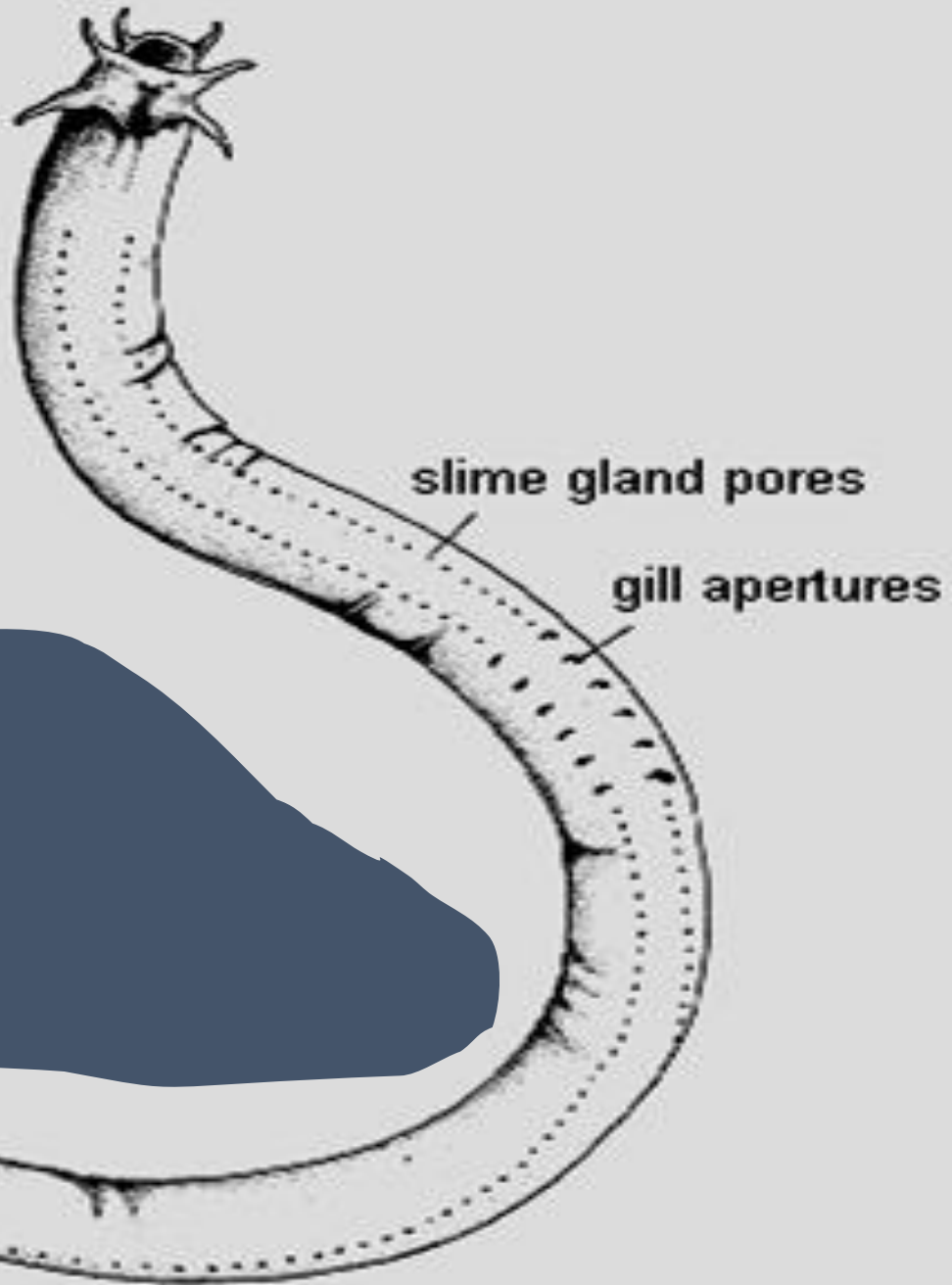




the single nostril



teeth in open mouth



slime gland pores

gill apertures

cloacal slit



THURSDAY, DECEMBER 28



# HAGFISH

with special guest  
**The Ketones**

Bricktown Live  
116 E. California  
Doors open at 7pm

Tickets only \$8  
on sale now at Rainbow Records,  
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**ALL AGES** Charge by phone: 948-6800



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MC 29	WITH HAGFISH & MENTHOL		
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# JAWED FISHES

- Divided into three groups early in evolution
- The Placodermi (now extinct)
- Chondrichthyes – cartilaginous fishes
- Osteichthyes – bony fishes

# PLACODERM





Photo: Dave Harris







DAVID FLEETHAM © 2000 [photo@maui.net](mailto:photo@maui.net)

# THE BONY FISHES

- Lungfishes (dipnoi, 6 species)
- Coelacanth (2 species)
- Ray finned fishes – Actinopterygii
  - Chondrostei – bichirs, sturgeons paddlefishes (36 species)
  - Neopterygii – rest of 22,000 known species of modern bony fishes





# WATER AND FISH

- Water characteristics drive fish biology
  - Density
  - Incompressibility
  - Universal solvent
  - Low light penetrability

# WHERE DO FISH LIVE?

- Salt water covers 70% of earth's surface; fresh covers 1%
- By volume salt water comprises 97% of all water; fresh comprises 3%, the majority of which is ice, atmospheric water, etc. (where fish do not live)
- Anadromy, catadromy, amphidromy

# FISH LIVE

- 13% associated with open ocean
- 1% in surface (epipelagic) layer
- 7% on bottom (deepwater benthic fishes)
- 78% of marine fishes (44% of all fishes) live in continental shelf

# HISTORY OF ICHTHYOLOGY

- Aristotle made first written recordings and observations about fish (300s BC)
- For 2,000 years no work done on fish
- Then in 1500s, three scientists published new works on fish
- Led to rapid expansion in knowledge and new interest in study of fish
- Linneaus and modern classification of fish
- 20<sup>th</sup> century sees diversification of ichthyology

# FISH CLASSIFICATION

- Organizing taxa into systems that demonstrate interrelationships
- Changes are being made all the time
- Kingdom, Phylum, Class, Order, Family, Genus, Species
- King Philip Came Over From Greece Swimming