



Outdoor Investigator

Coming Soon to
Schoolyards and Computers Near You!

BETH GIRARD

COMMUNITY PROGRAM ASSISTANT

THE RAPTOR CENTER – UNIVERSITY OF MINNESOTA

Raptor Lab

COLLEGE OF VETERINARY MEDICINE
THE RAPTOR CENTER

UNIVERSITY OF MINNESOTA
EXTENSION



VET IN TRAINING

Explore The Raptor Center and join the team as a vet in training!

RESEARCHER

Test your skills as a wildlife researcher as you investigate an authentic environmental mystery!



OUTDOOR INVESTIGATOR

Do your own science investigation!



 media.lab



Photo © Neil Rattig

Explore the Process of Scientific Investigation

Process of Scientific Investigation

Ask a question

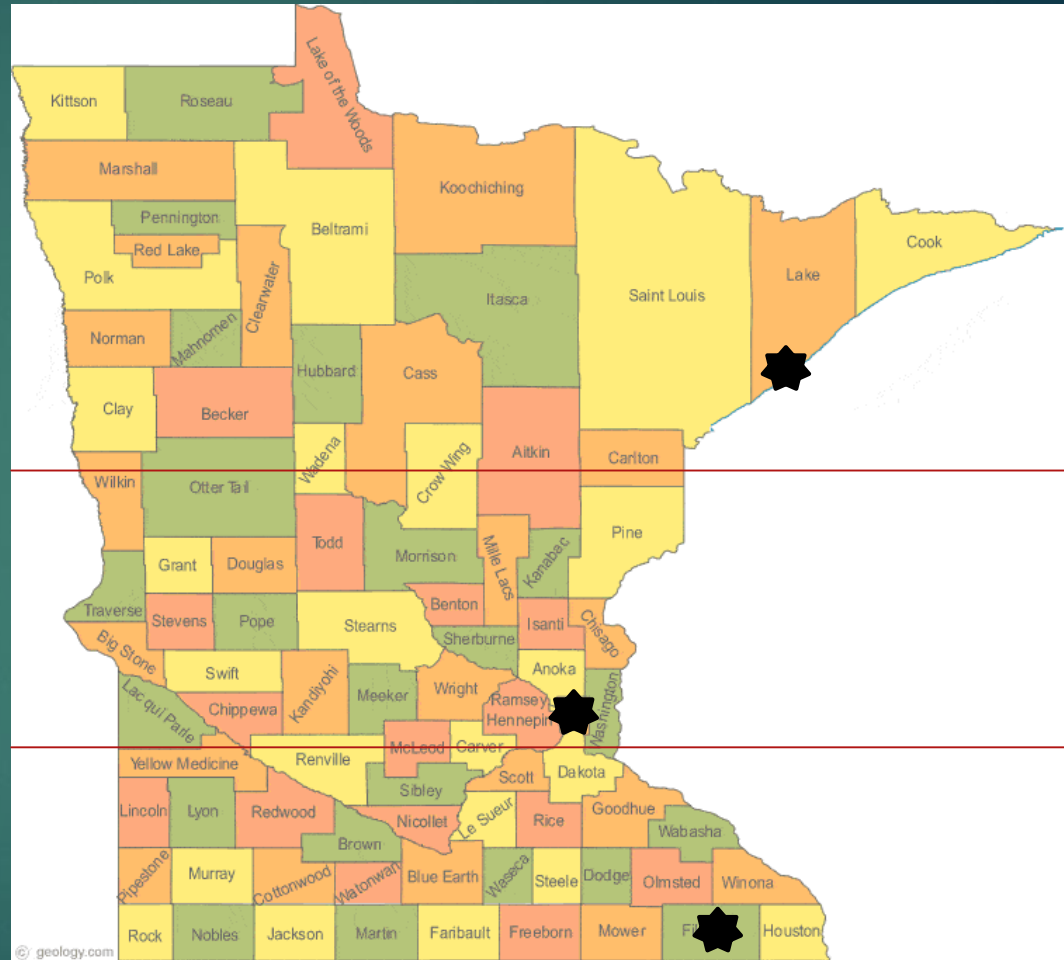
Gather evidence

Analyze evidence

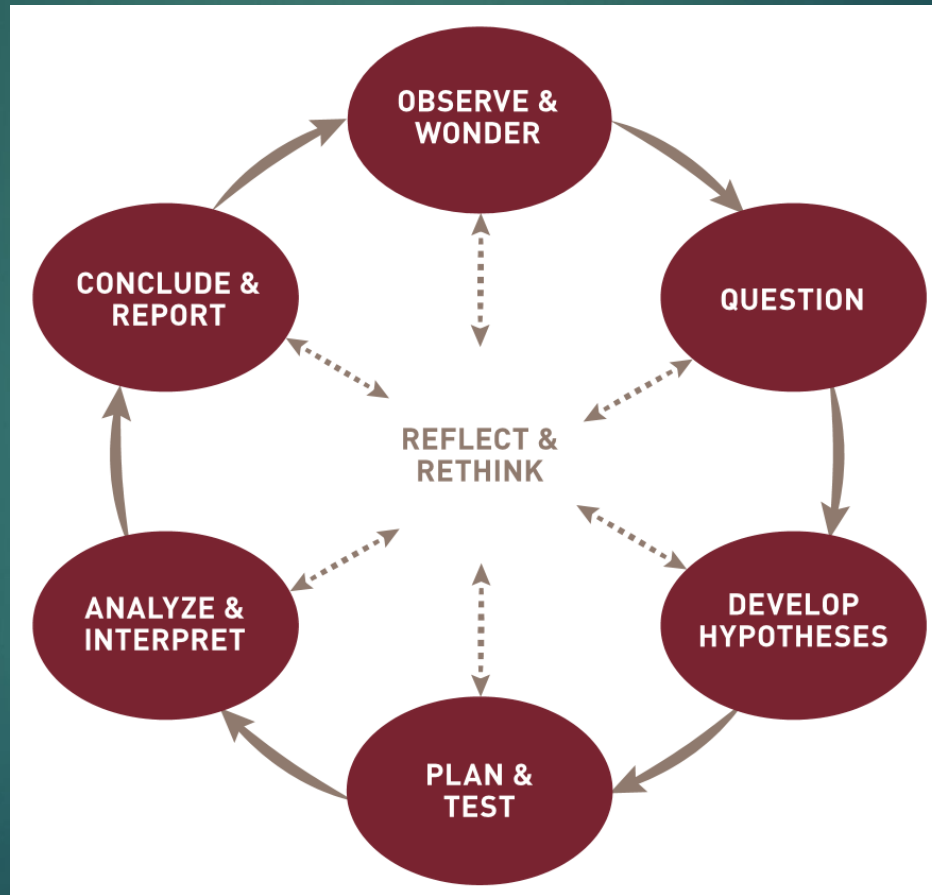
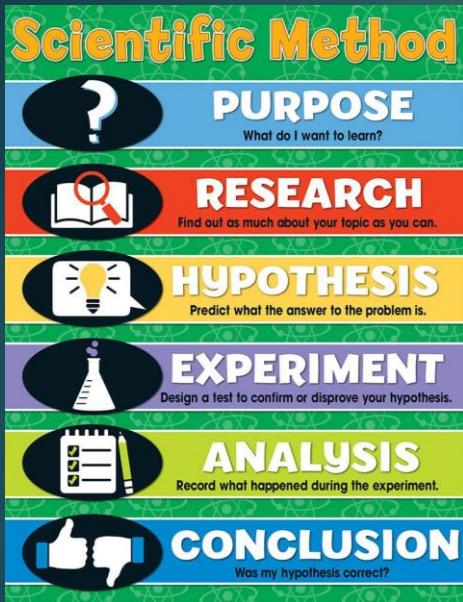
to make an evidence-based conclusion



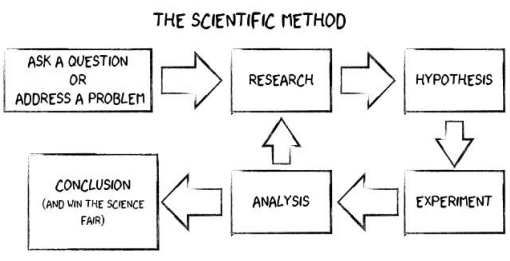
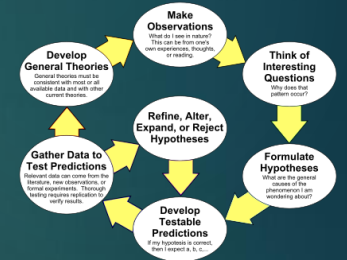
Sixty
workshops
will be
conducted
between
June 1, 2018
and June
30, 2019.



Variations on the same theme . The process of scientific investigation.



The Scientific Method as an Ongoing Process



RELIABLE – MEASUREABLE - REPEATABLE

As Practiced by **Real Scientists**

Raptor Lab

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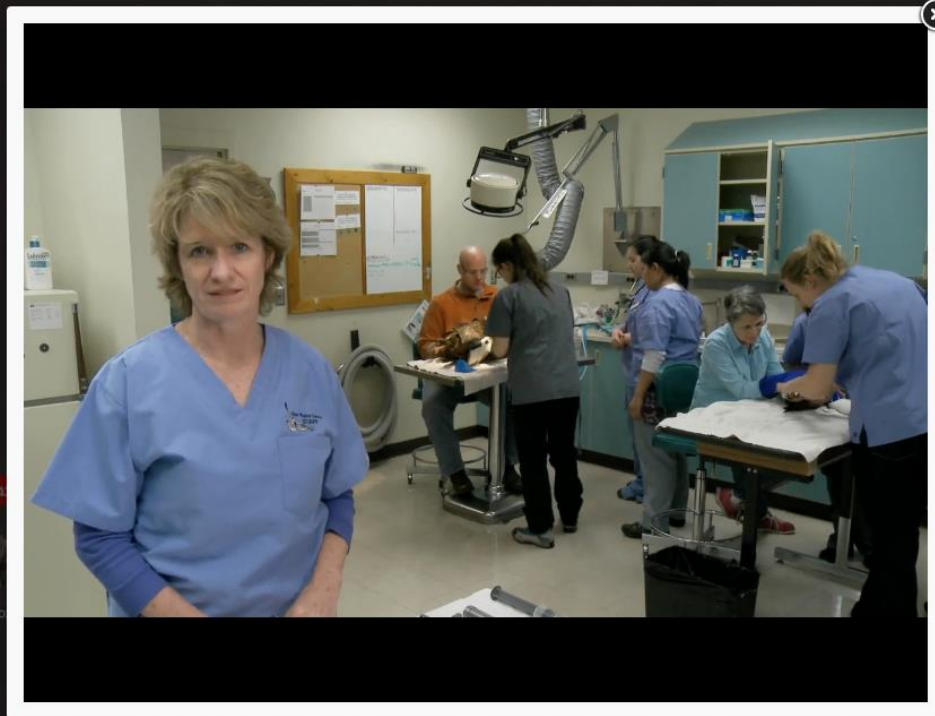
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In an **Authentic** Scientific Setting

Raptor Lab

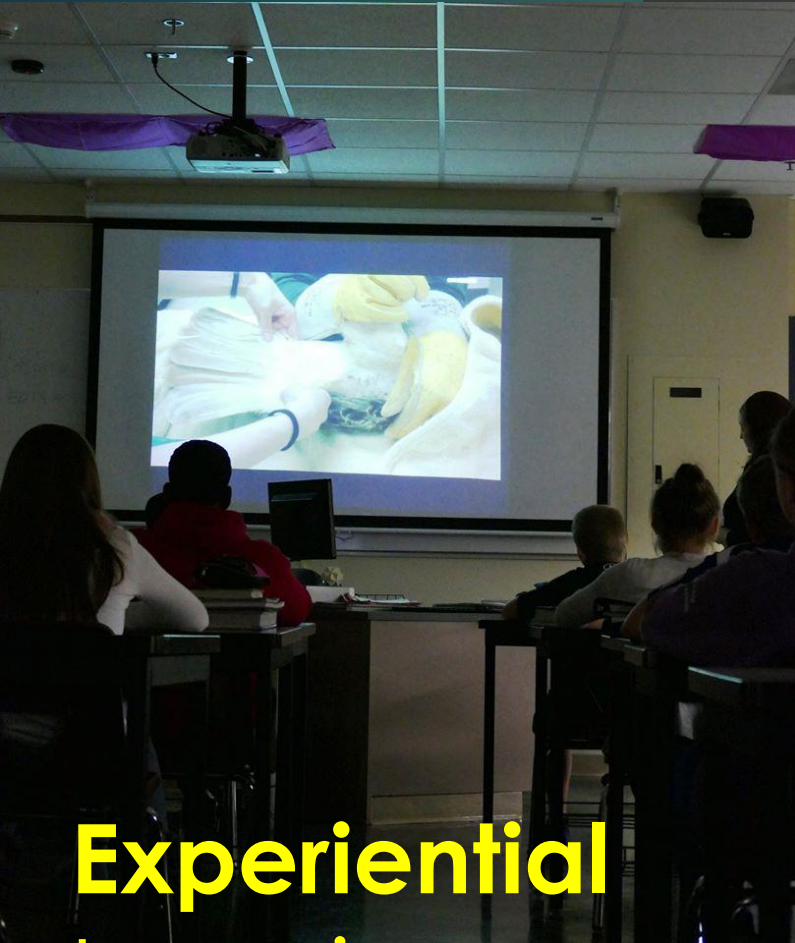
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Situated Learning

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Experiential Learning



The Raptor Center
University of Minnesota College of Veterinary Medicine



Name: _____ Hour _____

PATIENT MEDICAL RECORD

Case Number: 15-126

1. Admission Form (Admission video):

Primary veterinarian:		Recovery notes:
Admission date:		
Cause of admission:		
Recovery location county:		
Recovery location state:		

2. Physical Exam—Patient Information (Physical Exam video):

Species:	
Sex:	
Juvenile/adult:	
Weight:	


Inquiry-based Learning

Module 1: Experience Being a Vet

Raptor Lab

SIGN IN REGISTER

HOME | INTRO | **EXPLORE** | INVESTIGATE | SHARE



Your Mission

- video
- activities
- resources

admission & exam diagnosis & treatment conditioning & treatment

- Your Mission
- Admission
- Rehabilitation Process
- Physical Exam
- Diagnosis & Treatment

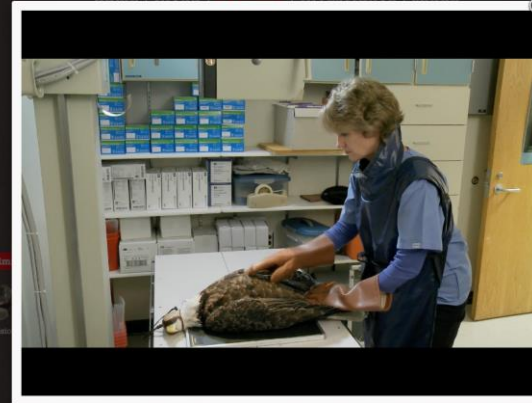
THE RAPTOR CENTER medialab funded by Minnesota Environment & Natural Resources Trust Fund about contact terms of use



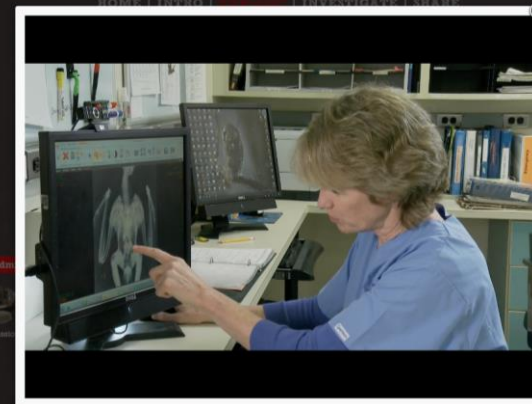
Experience



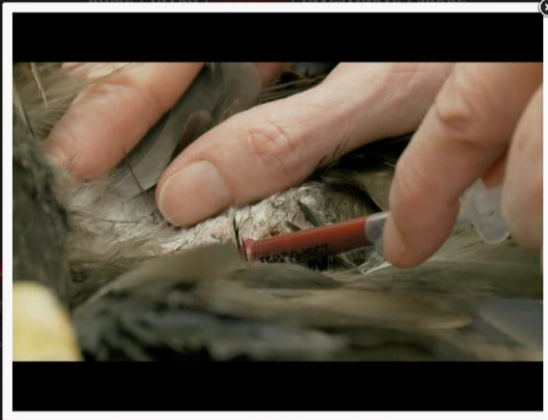
Physical Exam



Radiograph



Experience



Lab Work



Hematology									
Case assigned to: JP									
Patient Information			Date: 4/15/15		Case #: 15-184		Cage #: 30		
<input checked="" type="checkbox"/> Admission			<input type="checkbox"/> Pre-release		Species: BAEA		Fl. Room:		
<input type="checkbox"/> Recheck			<input type="checkbox"/>		<input type="checkbox"/> Routine		<input type="checkbox"/> Stat		
PCV: 40%		TP: 2.8		Buffy: 17%		Plasma: clear			
WBC Estimate: 17,550					Corrected WBC:				
Differential		Thromb	IMM	HEETS	LYMPHS	MONOS	EOS	BASOS	Blood Parasites
Absolute Number									
3+ polychromasia		Normal WBC morphology							
2+ poikilocytosis									
Request for additional lab tests									
<input checked="" type="checkbox"/> Lead: 0.57 ppm		<input checked="" type="checkbox"/> Banked Plasma/Serum							
<input type="checkbox"/> Serum Chemistry		<input type="checkbox"/> Other: _____							
Technician: JK									

Experience



Experience



Module 2: Wildlife **Researcher**



How did this bald eagle get exposed to lead?

Intro to Wildlife Research

▶ video



Intro to
Wildlife
Research



Your
Mission



The Problem



Background



Question &
Hypothesis



Materials &
Methods



Results



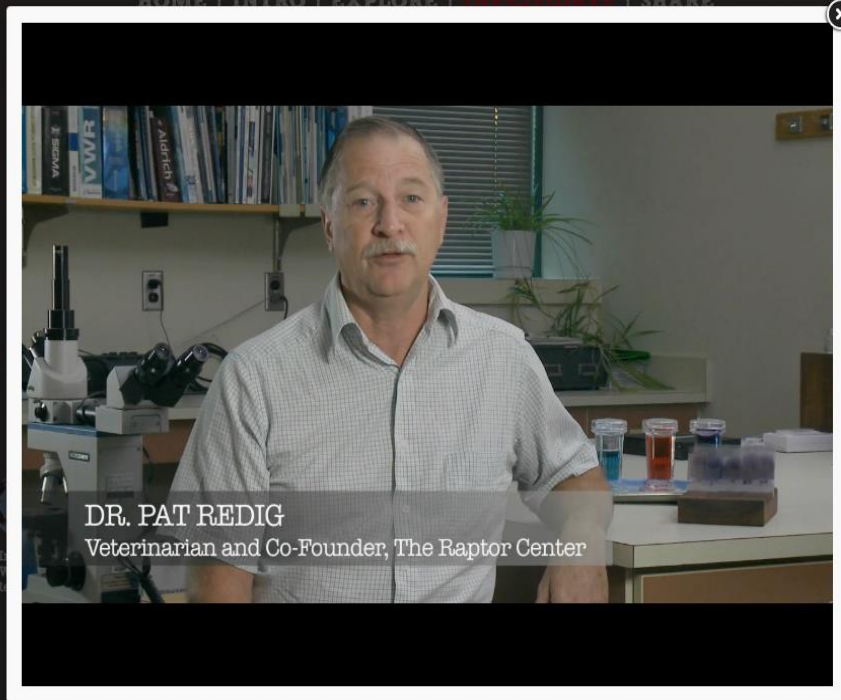
Discussion



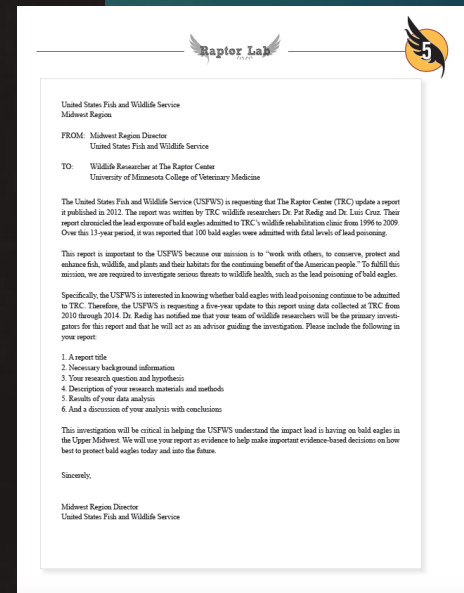
Wrap-up

Dr. Pat Redig – **World Renowned** **Expert** on Bald Eagle Toxicology

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DR. PAT REDIG
Veterinarian and Co-Founder, The Raptor Center



Research Question

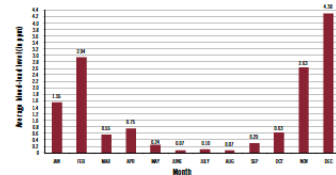
Does the pattern of lead poisoning in bald eagles match any seasonal pattern in human uses of lead to suggest a source of lead exposure?

CASE NUMBER	AGE	SEX	ADMISSION DATE	PRIMARY CIRCUMSTANCE OF ADMISSION	SECONDARY CIRCUMSTANCE OF ADMISSION	LEAD LEVEL (ppm)	COUNTY	STATE	RESOLUTION
10-004	AD	M	5-Jan-10	TX		2.65	St. Louis	MN	DD
10-008	AD	U	12-Jan-10	TX		1.13	Crawford	WI	DS
10-009	AD	F	14-Jan-10	TX		3.9	Hennepin	MN	DS
10-010	AD	F	15-Jan-10	CV		0.04	Lake	MN	DS
10-012	AD	M	23-Jan-10	TX		1.2	Polk	WI	DS
10-013	JV	M	23-Jan-10	MT		0.16	Winona	MN	DS
10-015	AD	M	30-Jan-10	TX		3.93	Ramsey	MN	DS
10-023	AD	M	18-Feb-10	MT	PR	0.03	Ramsey	MN	DS
10-036	AD	F	9-Mar-10	CV		0.13	Houston	MN	DS
10-041	AD	M	13-Mar-10	MT	TX	0.32	Mille Lacs	MN	DS
10-052	AD	F	21-Mar-10	RI	TX	0.33	Olmsted	MN	RLW
10-056	JV	M	23-Mar-10	MT		0.07	Oconto	WI	DS
10-057	AD	F	23-Mar-10	MT	TX	0.3	St. Croix	MN	RLW
10-061	AD	F	27-Mar-10	MT		0.06	Morrison	MN	DS
10-062	JV	M	27-Mar-10	CV		0.09	Aitkin	MN	DS
10-064	AD	M	29-Mar-10	TX	MT	3.2	Pine	MN	DS
10-065	AD	F	29-Mar-10	MT		0.11	Clayton	IA	DS
10-067	AD	U	30-Mar-10	TX	PR	0.32	Todd	MN	DS
10-069	AD	F	2-Apr-10	TX		0.35	Beltrami	MN	RLW
10-075	AD	F	5-Apr-10	MT		0.18	Crow Wing	MN	DS
10-076	AD	U	6-Apr-10	MT		0.14	Itasca	MN	DS
10-077									
10-086									
10-094									
10-104									
10-108									
10-113									
10-132									
10-133									



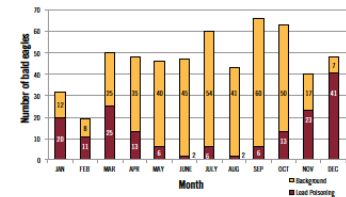
Graph 3: Average bald eagle blood-lead levels at time of admission to The Raptor Center from 2010 to 2014

	2010	2011	2012	2013	2014	5-year average
Jan	1.36	0.85	1.79	2.3	0.15	1.55
Feb	0.03	1.69	0.74	5.47	5.68	2.94
Mar	0.5	0.31	1.36	0.15	0.17	0.55
Apr	0.15	0.67	0.12	2.34	0.08	0.75
May	0.05	0.41	0.04	0.13	0.63	0.24
Jun	0.09	0.09	0.04	0.07	0.06	0.07
Jul	0.13	0.22	0.02	0.02	0.05	0.1
Aug	0.05	0.03	0.17	0.03	0.06	0.07
Sep	0.04	0.05	0.05	0.07	0.91	0.29
Oct	0.51	1.68	0.59	0.55	0.05	0.63
Nov	2.08	0.42	4.66	1.54	2.63	2.63
Dec	4.89	6.95	3.62	1.46	2.93	4.3



Graph 4: Number of monthly bald eagle admissions to The Raptor Center from 2010 to 2014

Month	Lead Poisoning	Background	Total	Percent with Lead Poisoning
Jan	20	12	32	63%
Feb	11	8	19	58%
Mar	25	25	50	50%
Apr	13	35	48	27%
May	6	40	46	13%
June	2	45	47	4%
July	6	54	60	10%
Aug	2	41	43	5%
Sep	6	60	66	9%
Oct	13	50	63	21%
Nov	23	17	40	58%
Dec	41	7	48	85%
Totals	168	394	562	30%



MODULE 3 – OUTDOOR INVESTIGATOR

GOALS

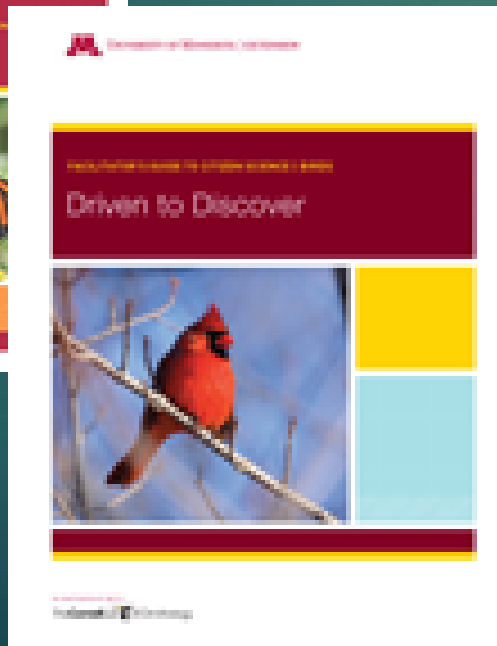
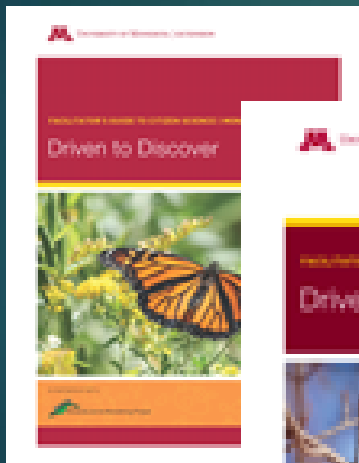
- ▶ Build on the principles of Modules 1 & 2
 - ▶ Situated Learning
 - ▶ Experiential Learning
 - ▶ Inquiry-based Learning
 - ▶ Teaching the process of scientific investigation
- ▶ MOVING IT OUTDOORS

CITIZEN SCIENCE

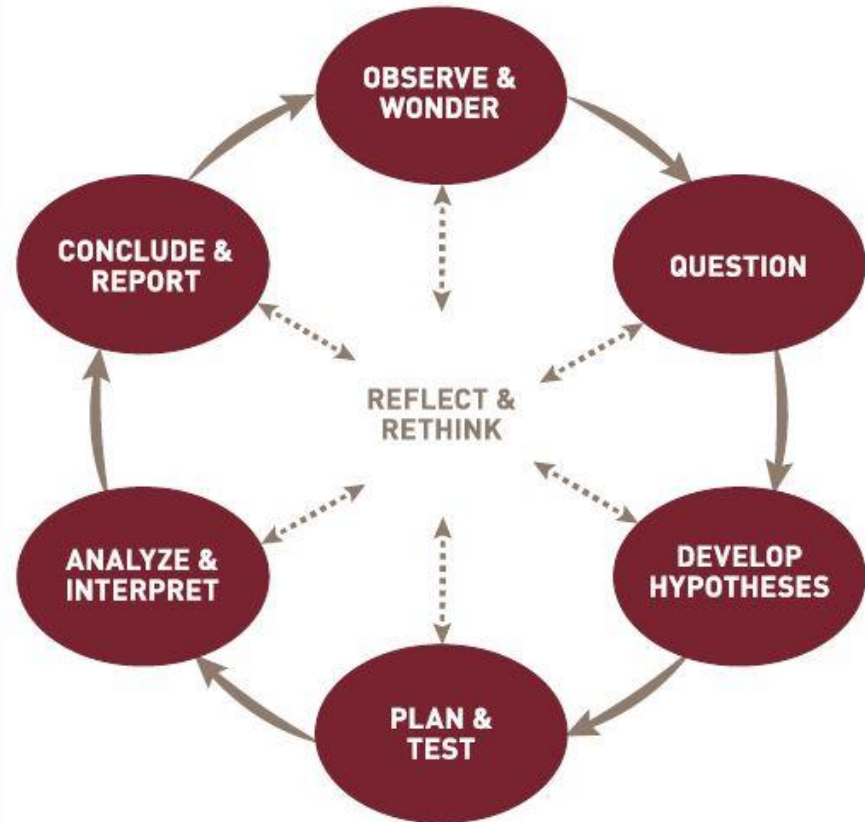
University of Minnesota
Extension

DRIVEN TO DISCOVER: CITIZEN SCIENCE

BIRDS



THE PROCESS OF SCIENCE



What do we hope to accomplish?

Working with our partners

- ▶ University of Minnesota Extension
- ▶ Learning Technologies Media Labs
- ▶ Wolf Ridge Environmental Learning Center
- ▶ Eagle Bluff Environmental Learning Center

We hope to provide educators with the tools

to teach their students the process of science investigation

OUTDOORS IN REAL SITUATIONS

USING CITIZEN SCIENCE

MAKING A DIFFERENCE

and then

Students outdoors making a difference FOREVER!

Shoot for the Stars

