

# Making and Recording Observations



# WARM-UP

What do you notice about your environment?

Record your observations.

# Share & Discuss

- ◆ What did you observe?
- ◆ What senses did you use?
- ◆ What tools did you use?
- ◆ What tools could you use to make more detailed observations?

# KEY QUESTIONS

What are observations?

What are some differences between casual and scientific observations?

What factors impact human observations?

How are observations recorded?



# Observations are a way to gather information.



What observations do soccer players make during a game?

What actions might they take, based on their observations?

**Observations can determine the difference between life and death.**



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# Powers of observation can vary greatly.

**Eagles** have amazing eyesight. They can focus on two places at once—forward and to the side.

**Bloodhounds** are superior sniffers. Millions of olfactory cells help them trace scents.

**Dolphins** can “see” using feedback from soundwaves. This complex sensory system is *echolocation*.



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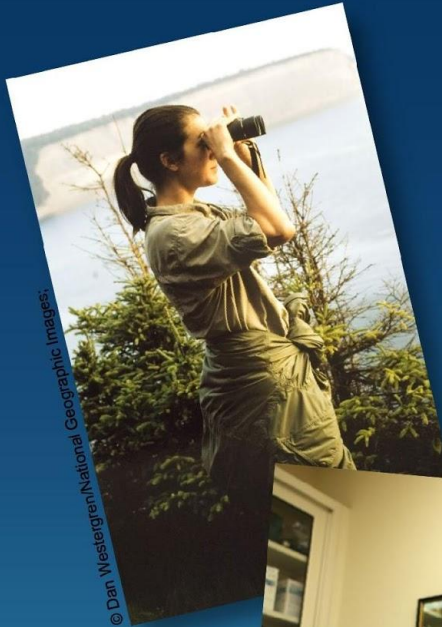


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# How have humans enhanced their powers of observation?





# KEY QUESTIONS

What are observations?

What are some differences between casual and scientific observations?

What factors impact human observations?

How are observations recorded?

**Take a look.**  
**Is this observation casual or scientific?**



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# Casual Observations

- ◆ Random
- ◆ Inferred
- ◆ Unsystematic
- ◆ Not recorded
- ◆ Missing specific details  
(e.g. “It is cold outside.”)

Can you think of an example  
of a casual observation?

# Scientific Observations

- ◆ Factual
- ◆ Systematic, repeatable
- ◆ Recorded
- ◆ Shared
- ◆ Quantifiable, when possible
- ◆ Lead to the formation of questions and hypotheses
- ◆ Detailed  
(e.g. “The air temperature is 6° Fahrenheit.”)

Can you think of an example  
of a scientific observation?



**Take another look.  
Is this observation casual or scientific?**



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# KEY QUESTIONS

What are observations?

What are some differences between casual and scientific observations?

**What factors impact human observations?**

How are observations recorded?



# Here are some factors:

- ◆ Location
- ◆ Duration
- ◆ Time of year
- ◆ Time of day
- ◆ Experience
- ◆ Knowledge
- ◆ Tools
- ◆ Timing



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Can you think of any others?

# KEY QUESTIONS

What are observations?

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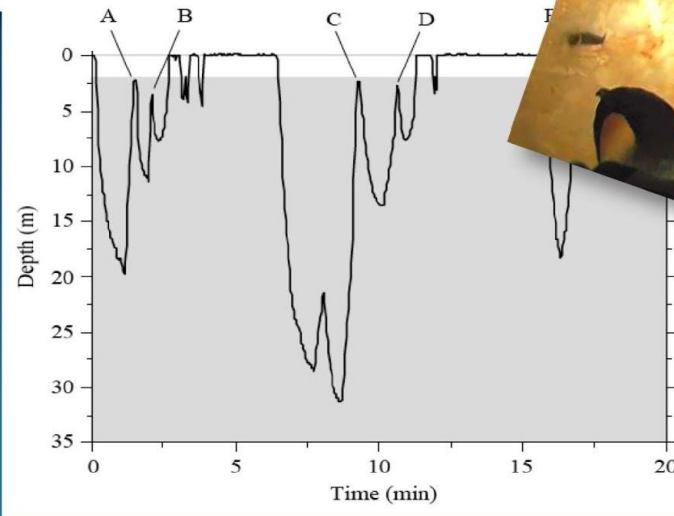


# Scientists use multiple techniques to record their observations.

- ◆ Describe it
- ◆ Draw it
- ◆ Graph it
- ◆ Map it
- ◆ Photograph it
- ◆ Videotape it
- ◆ Audiotape it

**Introduction**

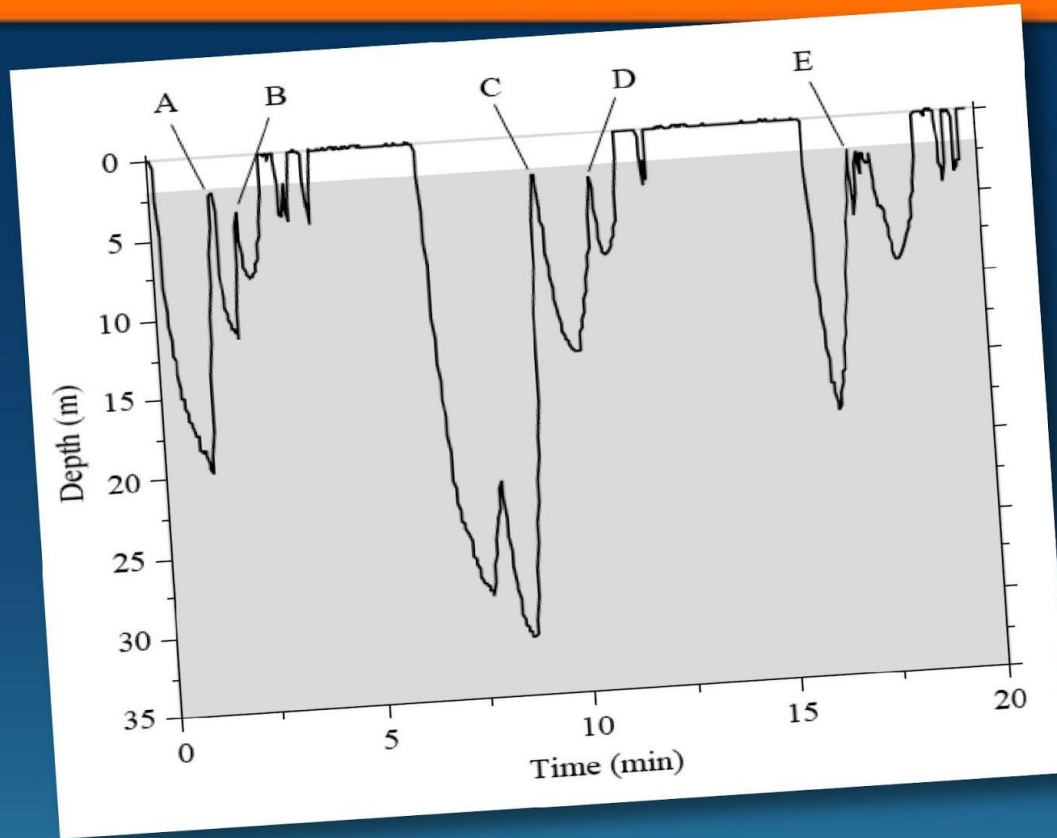
The isolated dive hole paradigm has been the primary method for investigating the diving physiology of emperor penguins (*Aptenodytes forsteri*). Heart rate responses, swimming velocities and metabolic rates have all been examined (Kooyman et al., 1992; K. A. Nagy, G. L. Kooyman and P. J. Ponganis, in preparation). Most importantly, this is the only situation in which the aerobic dive limit of an animal has been determined with post-dive lactate measurements (Ponganis et al., 1997). Although the aerobic dive limit is a function of body mass and



Shown: Research on emperor penguin feeding behaviors. Data and images collected in Antarctica by Paul Ponganis and Greg Marshall.



# Next, observations are interpreted.



What can be learned from the graph?  
What do the images reveal?

# Now Try Again

What do you notice about your environment?

Practice making and recording scientific observations!

# Share & Discuss



What did you observe?

What senses did you use?

Did factors such as time, location, tools, or knowledge impact your observations?



# Making and Recording Observations

