Star Treff, Ellen Murphy, Tiffany Davis
Facilitated by: Jo Topps

STEM-ECHOLOCATION

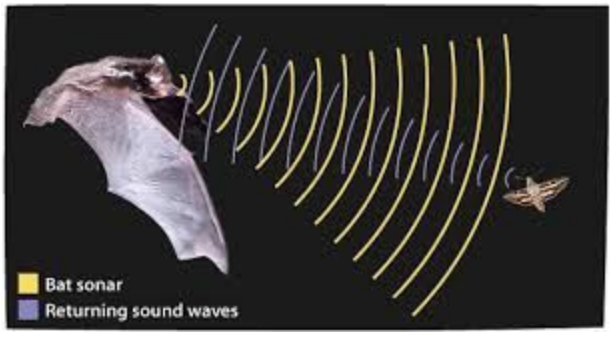
Friday's Schedule:

Meet at Rogers at 8:00
Tiffany's Classroom (Rm. 7): Teach at 8:25-9:25
Debrief (Rm. 8): 9:25-10:30
Lunch: Maria's (close to Cooley Ranch)
Drive to Cooley Ranch
Star's Classroom (Rm. 10): Teach at 12:30-1:30
Debrief (Library): 1:30-2:30

Standard:

- 4-LS1-2
- Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.
- [Clarification Statement: Emphasis is on systems of information transfer.]
- [Assessment Boundary: Assessment does not include the mechanisms by which the brain stores and recalls information or the mechanisms of how sensory receptors function.]

Phenomena: Natural or build world that cause us to ask questions

- Echolocation Video
- Anchoring Phenomenon: Bats use echolocation to locate food in the dark
    - 

    - Investigative Phenomenon: animals (bats) receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.
        - Specifically speaking about bats

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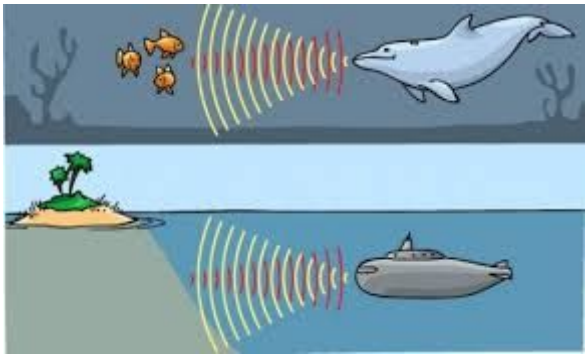


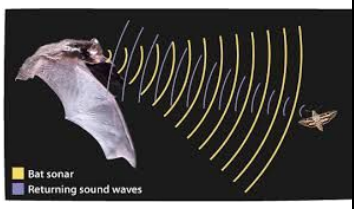
Teacher Prep: 3 pieces of white printer paper to make a mini notebook. Cups (1 per student), tennis balls (5-6), iPads (optional).

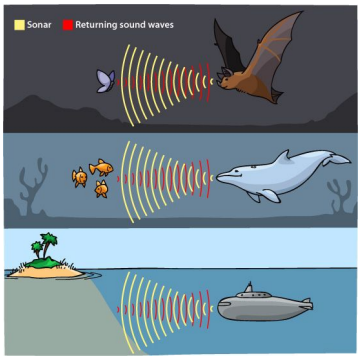
Learning Sequence Concept: Bats receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

*Plan backwards, start at the DCI/SEP/CCC column in the Explain row.
*Second, go up to Engage....Stay in DCI column.
*ESR's grow up and turn into Rubrics. :)
*TPR- total physical response

5E Stage	Teacher Does	Student Does	DCI/SEP/CCC
Engage (12 minutes) *Tiffany and Star teaching on 10-19-2017*	Draw a model about how bats get their food at night. (page 1 of mini notebook) -Label your picture. -Show what's happening in your picture. -Write a sentence about what is happening in your picture. Have students share -Turn to their tables and describe what's going on in their picture	Pre-assessment: -Draw a model about how bats get their food at night! Share with your table/partner what is going on in your picture. Expected Student Responses (ESR): -Draw a bat -Draw a moon -Draw a food source -Label parts -Relationships (might) -Write a sentence.	Students will know: -5 senses -Bats come out at night -Bats hang upside down -animal instincts (might) **Model will be used to surface student's understanding System Models: A system can be described in terms of its components and their interactions. Misconceptions (for us): -Bats are blind -Bats drink blood.
Explore	Teacher shows the video	Kids will watch the video 3 times.	LS1.D: Information Processing

(Video/ questions 15 minutes) (Tiffany does)	Echolocation Video -Watch the video once just to see whats happening. -Watch it a second time and write down as many questions as possible **Teacher will include questions also (picture) -Watch a third time and try to answer as many questions as possible.	1. Just watch. 2. Think and write questions. 3. Answer questions that you have written.	-Different sense receptors are specialized for particular kinds of information which may then be processed by an animal's brain. Animals are able to use their perceptions and memories to guide their actions. Using Models: use a model to test interactions concerning the functioning of a natural system. System Models: A system can be described in terms of its components and their interactions.
(Cups/discuss 10 minutes) (Star does)	Total Physical Response: -Lead students in cups TPR activity -Leads a discussion about what they observed. -How is this similar to what happened in the video? (i.e.., bat & moth)	Total Physical Response: -5-7 students at a time make beeps/echos into a cup with back turned to class. -Hands out-stretched and slowly bringing cup towards mouth stopping when cup touched nose. -Repeat till all students experience ESR -My voice echoed back to me. -I am the bat -When I got closer to the cup, it got louder. I could hear my voice echoing/coming back towards me.	4.W.1: Write opinion pieces on topics or texts, supporting a point of view with reasons and information. SL.4.5: Add audio recordings and visual displays to presentation when appropriate to enhance the development of main ideas or themes.
(Tennis Ball/video/ Write 25 min) (Ellen does)	-Tennis Ball named "Sound" -How can you show me that sound starts at one place and then comes back to you? -Think, pair, share Moth target:  -Students record each other showing how to	-Think, Pair, Share with your group -Students write what a narrator would say while reviewing their mini video they created (in response to sound)	

	move sound -Turn the sound off -Write what a narrator would say to match the video		
Explain ***(draw and label 12min) (homeroom teacher)***	Ask students to redraw their models of how bats get their food, using labels and the relationship between it and its prey	 Redraw a model of how bats get their food. -Include labels -Include relationship that the sound wave comes from the bat, bounces off of the food source, and returns to the bat so it knows where the food is.	LS1.D: Information Processing -Different sense receptors are specialized for particular kinds of information which may then be processed by an animal's brain. Animals are able to use their perceptions and memories to guide their actions. Using Models: use a model to test interactions concerning the functioning of a natural system. System Models: A system can be described in terms of its components and their interactions.
Elaborate ***(Same concept in a new situation)***		ESR -Boat under water -Small, no windows, -looks like a missile -Cameras? -radar -long telescope	LS1.D: Information Processing -Different sense receptors are specialized for particular kinds of information which may then be processed by an animal's brain. Animals are able to use their perceptions and memories to guide their actions. 3-5-ETS1-2: Influence of Engineering, Technology, and Science on society in the natural world: People's needs and wants change over time as do their demands on new technologies.

	-What is a submarine? -What do you notice about it? -How can you see what's around you? -How do they know how far they are from the iceberg? https://www.youtube.com/watch?v=FqDNSFzVVNTA		Using Models: use a model to test interactions concerning the functioning of a natural system.
Evaluate	 -What do you think is going on with the dolphin in the picture? -Write in the journal. Use the models to describe the similarities and/or differences for 2-3 of the examples. Give this worksheet to your students!	ESR -They all are using sound to find something (prey or location). -GATE might be able to make the connection that 1 is in the air, 1 is man-made, 1 is natural underwater.	

Engage: E.L.L. Activity

- Give students a chance to practice their own echolocation.
  - Choose one student to be the bat, and blindfold him or her.
  - Arrange the other students in a circle around the bat, and select another student in the circle to be the bat's prey.

- Ask the bat to call out ECHO from the center of the circle.
- The prey should respond LOCATION.
- The bat continues to say echo, moving slowly toward the location of the prey.
- Once the bat has found the prey, he or she stops and takes off the blindfold. Allow other students to take turns at being the bat or the prey.

ELA Integration:

https://www.smithsonianmag.com/science-nature/what-is-killing-the-bats-16824335/

Art Integration

Standards:

Communication and Expression Through Original Works of Art

2.7 Use contrast (light and dark) expressively in an original work of art

Diversity of the Visual Arts

3.2 Identify and discuss the content of works of art in the past and present, focusing on the different cultures that have contributed to California's history and art heritage.

Communication and Expression Through Original Works of Art

2.5 Use accurate proportions to create an expressive portrait or a figure drawing or painting.

Teacher Do's: Purple Font

Whole Class Do's: Orange Font

Student Do's:Red Font

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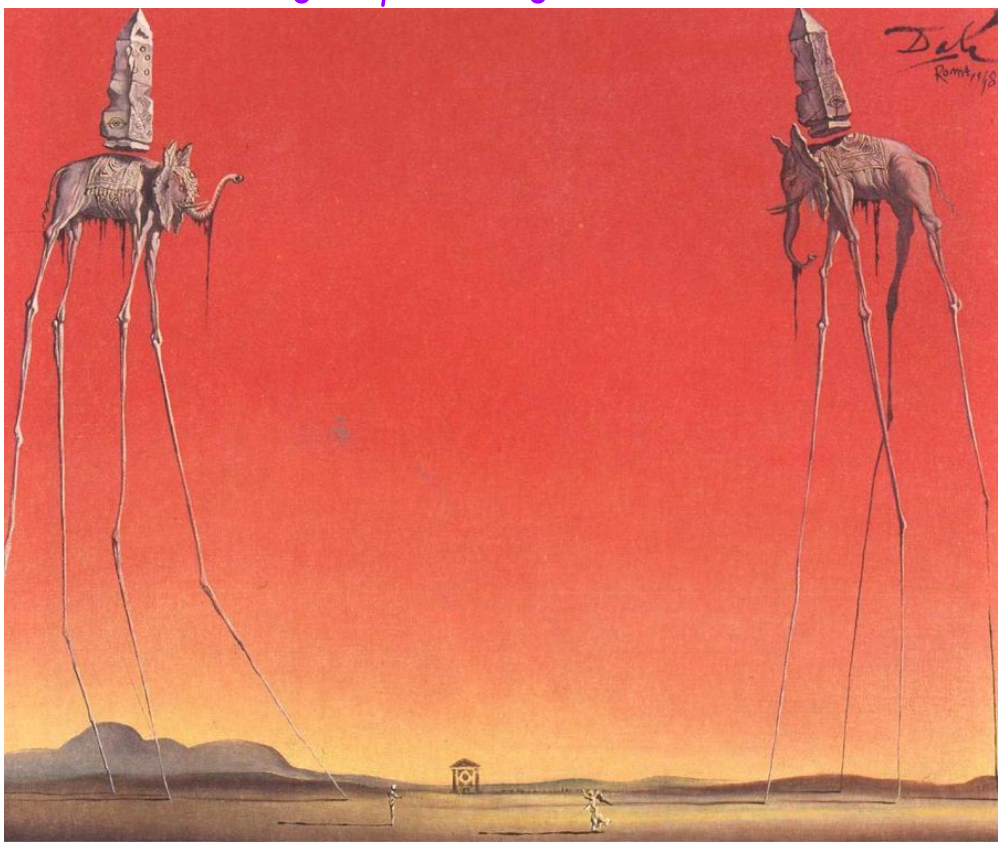
Teacher would begin by showing the work of Salvador Dali as the Engage:



Students would discuss in pairs what they see in the paintings.

1.3 Identify pairs of complementary colors (e.g., yellow/violet; red/green; orange/blue)

As a class we will then discuss his use of color in the Elephant painting and how he uses complementary colors.
In the Bat Painting we will talk about how he used the dark colors on the top and bottom and light in the the middle.

Teacher will then show a Dali painting to illustrate Symmetry

We will then go back to look at the Bat painting to see if it also has Symmetry.

Then teacher will show the students pictures of real bats and their anatomy.

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Student pairs will discuss what they notice about the bats and their bodies. Whole Class responses could be: Big ears, small eyes, flat noses, wings resemble hands.

The teacher will then explain to the students their assignment, using the standard, Communication and Expression Through Original Works of Art
2.5 Use accurate proportions to create an expressive portrait or a figure drawing or painting.

Students will Draw/sketch a Bat with symmetry using the website, Art Hub for kids https://www.youtube.com/watch?v=GvCYvyatb3E

After, they sketch the bat, they will outline it with Black thin tipped sharpie.

Finally, they will paint it with water colors using the Dali paintings as inspiration. They will need to some type of light and dark contrast in the background.