Lesson Plan: Restoration Channel Island Debate

By: Nichole Hughes

Debate format inspired by Lucy Calkins and Alexandra Marron's book *Interpretation Book Clubs Analyzing Themes Grade 5 Unit 1,* "Session 13 Debating to Prompt Rich Book Conversation: Readers Have Different Viewpoints, Defending with Claims, Reasons, and Evidence"

Target Grade: 5th

Teacher Prep Time: 30 minutes

Lesson Time: 2 hours and 10 minutes (This lesson can be completed over two days or over two separate sessions)

- Part 1:
  - 5 minutes - (a) Beginning Thoughts
  - 15 minutes - (b) Introduction to Debatable Questions
- Part 2:
  - 45 minutes - Research Channel Islands and Debatable Topics
- Part 3:
  - 30 minutes - Debate
- Part 4:
  - 20 minutes - Debrief

Lesson Overview: In this lesson, students obtain and combine information from multiple media sources about ways Santa Barbara County uses science ideas to protect the Channel Islands' environment and the native and non-native species that live on Santa Cruz Island. To learn about these issues, students will watch a tale from the documentary *West of the West* and will be provided with articles from local newspapers. Students will then learn about debatable ideas and use this knowledge to form a debatable question regarding the Channel Islands restoration issues. Students will choose a side of this question to debate, search for evidence to support both their claim and their opponent's proposed claim, and hold a debate with another group.

Learning Objective(s):

- Students will be able to define a debatable question and come up with one themselves.
- Students will be able to form an argument (claim, evidence, and reasoning) to defend a stance on a debatable question.
- Students will be able to use evidence to form a counterargument to an opponent's claim.
- Students will understand that humans have had both a positive and negative impact on the Channel Islands' environment.

NGSS: 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

- **Science and Engineering Practice**
  - #7. Engaging in Argument from Evidence
    - Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).
      - Construct and/or support an argument with evidence, data, and/or a model.

        - Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.
- **Disciplinary Core Idea**
    - ESS3.C: Human Impacts on Earth Systems
        - Societal activities have had major effects on the land, ocean, atmosphere, and even outer space. Societal activities can also help protect Earth's resources and environments.
- **Cross Cutting Concept**
    - #7. Stability and Change
        - In grades 3-5, students measure change in terms of differences over time, and observe that change may occur at different rates. Students learn some systems appear stable, but over long periods of time they will eventually change.
- **Environmental Principal and Concept**
    - #2 People Influence Natural Systems
        - The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.
            - Concept A. Direct and indirect changes to natural systems due to the growth of human populations and their consumption rates influence the geographic extent, composition, biological diversity, and viability of natural systems.
            - Concept B. Methods used to extract, harvest, transport, and consume natural resources influence the geographic extent, composition, biological diversity, and viability of natural systems.
            - Concept C. The expansion and operation of human communities influences the geographic extent, composition, biological diversity, and viability of natural systems.
            - Concept D. The legal, economic, and political systems that govern the use and management of natural systems directly influence the geographic extent, composition, biological diversity, and viability of natural systems.

Where This Lesson Fits in:
This lesson is recommended to be used after an opinion reading and writing unit has been taught.

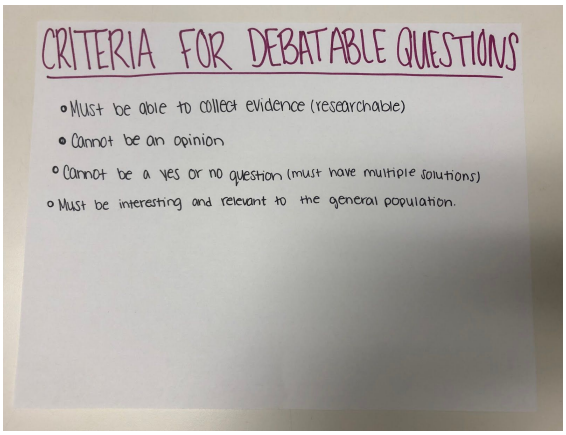
Materials Needed:
- 3 Large pieces of butcher paper or poster paper to record anchor charts on
- Bell or whistle
- Markers
- Restoration Channel Islands Debate Powerpoint Presentation
- West of the West Tales from California's Channel Islands movie segment- Part 3- Restoration https://channel-islands.squarespace.com/
- 2 copies of each article for every small group (4-6 students per group)
- 1 copy of the Recovery of the Channel Island Fox graph (4-6 students per group)
- 1 copy of the Restoration Channel Islands Debate notebook for each student
- Highlighters
- Pens and pencils
- 1 map that includes the California Channel Islands

Teacher Prep:

- Organize students into groups (~4-6 students each)
- Make 2 copies of each article for every group (4-6 students each)
- Make 1 copy of the Recovery of the Channel Island Fox graph for every subgroup
- Make 1 copy of the Restoration Channel Islands Debate notebook for each student
- Make sure you have a large open area to have this debate (about 20 feet).
- Optional- Make the "Let's Have a Scientific Debate" chart (the directions for this is in the Google Slides presentation).

Lesson Sequence:

Part 1 (a): 5 minutes	**Beginning Thoughts and Debatable Questions** 1. Open the Google powerpoint presentation to the first slide showing a picture of a feral pig and the Channel Islands fox. 2. In a think-pair-share, ask students based on what they know about the needs of living things to discuss what a feral pig and Channel Island fox would need to survive. Record responses on chart paper/whiteboard. o Expected Student Response (ESR): food, water, shelter 3. [If you are a Central California school]Tell that class that the feral pig and the fox are two species that live on the Channel Islands, an environment that they are probably familiar with (point out the location of the Channel Islands on a map, slide 2). 4. Explain to the class that today they will be searching for evidence to form an argument to understand how Santa Barbara County used scientific ideas to protect the Channel Islands' resources and environment and how the fox and the feral pig are related to this (slide 3). 5. Introduce the vocabulary (slide 3) to the students. o Native Species - A species that normally lives and thrives in a particular ecosystem o Non-Native Species - A species that has been introduced to an area that it is not normally found in by some outside means o Invasive species - an non-native organism that causes ecological or economic harm by reproducing and spreading quickly 6. Make sure that students understand that non-native species are not always invasive. 7. Tell the students that the pigs were brought to the island by humans. Ask them if this would be a native or non-native species. o ESR: non-native 8. Tell the students that the fox's natural ecosystem is the Channel Islands and they were not brought there by outside means. Ask them if this would be a native or non-native species. o ESR: native 9. Tell the students that as part of our research, we should find out if any invasive species were brought to the Channel Islands.
Part 1 (b): 15 minutes	**Introduction to Debatable Questions** 1. Tell the students that upon completing our research, we will need to formulate arguments to justify the actions that Santa Barbara County took to deal with the changes to the Channel Islands ecosystem. In order to do this, we will hold debates.

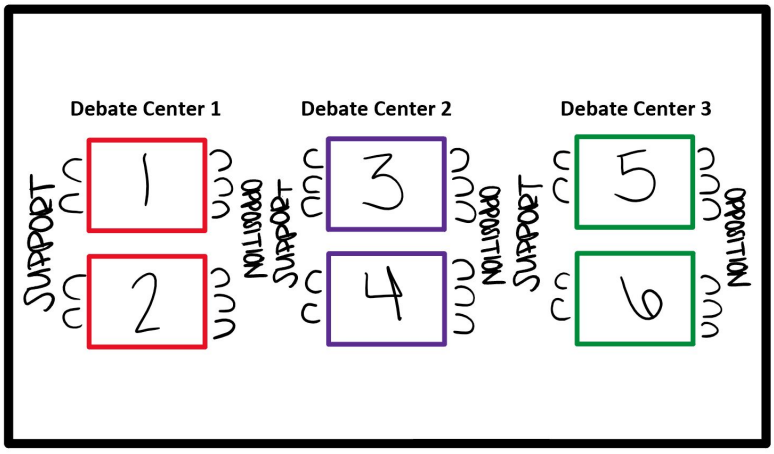
	2. Tell students that in order to hold a debate, we need to understand what types of questions are able to be debated (open slide 4 and pass out the Restoration Channel Islands Debate notebook to each student). 3. Go through the example questions on slide 4 and have students decide whether they are debatable or not and why. a. Which company has more power, Facebook or Google? i. ESR: Debatable, can research donations/ads/size of company/etc b. Is putting pineapple on pizza a good idea? i. ESR: Not debatable, opinion c. Is a guinea pig smaller than a horse? i. ESR: Not debatable, yes or no question d. Should the school day start later? i. ESR: Debatable, can collect evidence on different factors that affect student learning abilities. ii. Lead students to understand that this question is also relevant and interesting to a general population, which adds to it being a provocative debatable question. 4. As the students are explaining why each question is or is not debatable, generate a "Criteria for Debatable Questions" list on the chart paper/whiteboard. a. Students should copy this chart into their notebook on the top of page 1. 
Part 2: 60 minutes	**Research Channel Islands and Debatable Topics** 1. Tell students that they are now going to watch a video about the Channel Islands' ecosystem. Ask students to think about some debatable topics as they watch the movie and write down these ideas in their notebook on page 1. 2. Watch the "Restoration" movie segment as a class (link in slide 6). It will last ~11m 35s. 3. Ask the students to share out their ideas of debatable topics/questions. As they share, make a list of them on the whiteboard. 4. Tell your students that they will be split up into "debate groups" for the debates. Each group will have 4-6 students and those students will form teams of 2-3 students. One side of the debate will be the "Supporting Team" (in favor of question) and one side will be the "Opposing Team" (opposes question). 5. Have them look at page 2 of their notebook and explain that each group will use the "Boxes and Bullets" (Lucy Calkins & Alexandra Marron Readers' and

Writers' Workshop) to organize their question, claim/thesis statement, reasons and evidence: (slide 7)

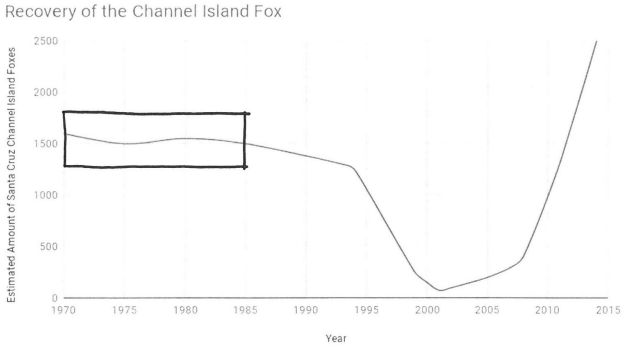
Claim/Thesis Statement:

- because Reason 1
  - Evidence A
  - Evidence B
- because Reason 2
  - Evidence A
  - Evidence B
- because Reason 3
  - Evidence A
  - Evidence B

6. Tell the class that as a debate group, they will need to decide their debatable question, then decide which students will take the support and the opposition.
   a. Explain to the students that true debaters are able to argue for either position and sometimes they need to argue against what they actually believe about the issue. They should work to gather evidence for both the support and the opposition to make their arguments stronger.
7. Split the students into debate groups (4-6 students). Once they are in their groups, tell the students that you will give them 3 minutes to decide on a debatable question from the list on the whiteboard. Once they have decided on a debatable question, they should write that question down under Step 1 in their notebooks.
   a. You should have ~5 debatable questions on the board. Even if 3 groups choose the same question, that will still allow for a little variety.
8. Tell students you will now give them 3 minutes to decide which students will take the support and which will take the opposition. Each team will have 2-3 students. Remind them that in a true debate, people may not always debate the side of the argument that they agree with.
   a. Tell them that once they have decided, they should check off the box of the side they will be representing in Step 2 in their notebooks.
9. Move throughout the classroom urging students to not take this too personally and to quickly decide on sides. Congratulate students who took a risk and choose sides that were difficult or ones they did not agree with (Calkins & Marron, *Interpretative Book Clubs*).
10. Tell students that in teams, they will now need to write a claim or thesis statement for their side of the argument under Step 3 in their notebooks, and you will give them 3 minutes to do so. Tell them that if they are struggling, they can call you over for help.
11. Tell the students that they are now ready to start collecting evidence to support their claim. Explain that we will watch the "Restoration" video segment for a second time so students can gather reasons and evidence. Then you will pass out articles to each group that they will use to collect more evidence and reasoning. During the evidence collection time, students should take notes in the box on page 2 to help them organize their thoughts. These can be rough and messy and taken in any form they desire (full sentences, bullet points, drawings).
12. Play the "Restoration" video again.

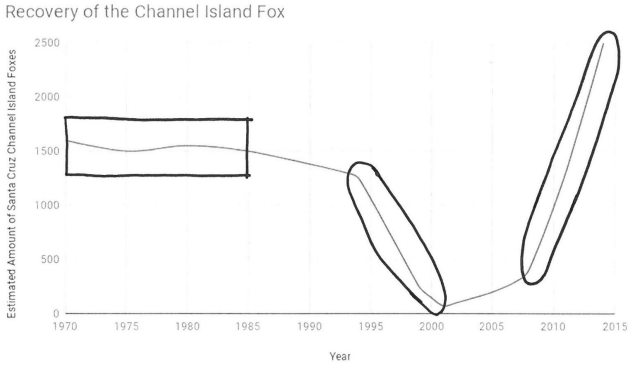
	a. While students are watching the movie segment, choose a debatable question that the students are not using and record your own thesis statement, reasons, and evidence for both sides of the argument on the whiteboard or chart paper as a model for the students. If desired, you could make a few of these charts prior to the lesson. 13. Once the video has ended, direct your students' attention to Steps 4 (support their claim), 5 (their opponents' possible claim), and 6 (support their opponents' claim) in their notebooks and explain the format in which they will fill out their reasons and their evidence. Explain that this should be done in their teams, and not their debate groups. a. Tell students that for Step 6, they should collect <u>at least two</u> possible reasons to support their opponents' claim and at least one piece of corresponding evidence for each reason. b. This will allow students who work more quickly to have something else to do, and students who work slower to not be overwhelmed with the amount of work. 14. Next, direct your students' attention to the outline that you have made for them at the front of the classroom. Walk through your claim, evidence, and reasoning and tell them that they can use this as a model to help them when filling out their notebook pages. 15. Pass out 2 sets of articles to each debate group. Instruct the students to continue filling out Steps 4,5, and 6 of the worksheets. a. While your students are collecting evidence and writing it in their notebooks, you should continue rotating around the classroom and spend ~4 minutes with each team to allow them to ask questions/clarify things they don't understand.
Part 3: 30 minutes	**Debates** 1. Once students have collected all of the evidence and reasoning for their side and their opponents' side of the argument, split the groups into "debate centers." Tell the students that each group will debate while another group watches them. a. We recommend setting up your room similar to the picture below. The tables should be close enough that the observing group can hear the debating group. The number of chairs is arbitrary and depends on the number of students per team/debate group. b. If possible, set up the groups so that the debate centers have two different debate topics being presented. 

	2. Explain that there will be 3 rounds of the debate. The first is a practice round that will occur within your group. All groups will do this at the same time and will practice reading their argument in Step 4 (page 3) of their notebooks. Record the letter P on the board for practice. 5. Go over the Debate Rules (slide 8). a. Each side gets one minute to present. (Read the sentences n Step 4 [page 3] of the student notebook.) b. Same-team partner(s) may whisper in or write notes. c. Each member of the team will need to present at least 1 reason with supporting evidence for their side of the argument. d. Opposite side takes notes (Step 7 [page 6], student notebook). e. Caucus! Compare notes with your team and decide which of your opponents' points were strongest and how to respond to them (Step 8 [page 7], student notebook). f. The group viewing the debate should caucus among themselves to discuss important points that both sides bring up as well as what each team did well/could improve on. They should write these notes in Step 10 (page 8) of the student notebook. i. Teacher Note: This is not for the purposes of deciding the winner of the debate, it is just to get the students objectively thinking about different viewpoints and how to improve as debaters. g. Each team will have an additional minute to respond with their counterargument by reading the sentences in Step 8 (page 7) of the student notebook. h. When the debate is ready to begin, the teacher will give the signal (ring a bell or blow a whistle). 6. Model the debate using the sentence frames (slide 9) for the argument you picked in Part 2. a. Remind students that they will be reading their arguments from the sentences in Step 4 of their notebooks that follow the same format as your argument. 7. Tell students they will now start the practice round. Put up a 1 minute timer and have students do a practice round. 8. Once the timer has gone off, tell the students it is time for the first round. As the teacher, flip a coin to decide which half of the tables will go first (1, 3, 5 or 2, 4, 6 from the diagram of debate centers above). 9. When all students are ready to begin, give the "go" signal (blow whistle, ring bell). a. The Supporting Team will present their side first within the one minute timer. The Opposing Team should be taking notes on their argument(Step 7 [page 6] of the notebook). b. You should walk around and listen to the groups presenting. 10. After one minute is up, ring the bell to signal the opposition to begin their argument. 11. At the end of the round, tell students that they will now caucus to prepare for their counterclaim. Pull up slide 10 of the powerpoint. a. Set a timer for 5 minutes and have the students prepare counterarguments.

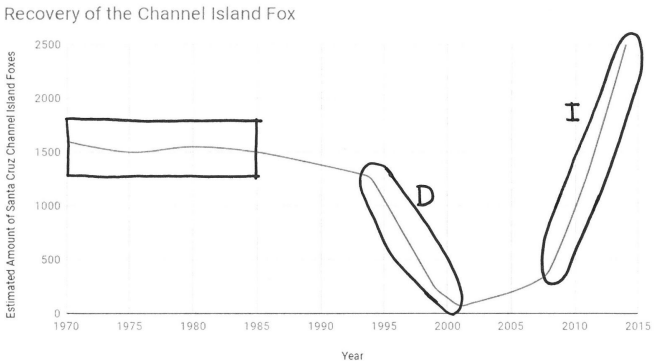
	b. Observing teams should be discussing and writing the strongest points that each team presented as well as what each team did well/could improve on. 12. Repeat debate format for round 2 (first support then opposition counterarguments) by reading the sentences n Step 8 (page 7) of the student notebook. 13. Once the first set of debates has finished, have the students shake hands and congratulate each other on finishing the debate. Then, have the next group of debaters get ready to present. 14. Repeat steps 9-13 for the second group of debates. 15. When all debates have finished congratulate the class on a job well done. a. Have students think of a positive comment and something they noticed another student in their debate center did well (call on three students to share). b. Have students think of one thing they personally would do differently next time.
Part 4: 20 minutes	**Debrief** 1. Tell the students that we are going to learn more about the Channel Islands' environment and discuss some of the points that were made during the debate. 2. Have students turn to page 9 of the worksheet while you place an example student notebook under the document camera to follow along. 3. Direct students' attention to the graph at the top of the page and tell them that we will use this graph to answer some questions. 4. Read question 1 to the students and have them answer it on their own and share out (In one sentence, describe what data this graph contains). a. ESR: How the amount of Channel Island Foxes has changed over time. 5. Ask students what the time frame for the graph is (question 2). a. ESR: 1970 - 2015 6. Ask the students why they think the graph begins in 1970 (question 3). a. ESR: Scientists were not collecting data on the foxes until then. 7. Remind students that the graph is showing us how the number of Channel Island foxes has changed over time. Then ask them what it means for a population to be stable (question 4). a. ESR: The population doesn't change over a period of time. 8. Ask students to look at the graph and put a box around where the population of foxes was relatively stable (question 4). a. Have one student place their graph under the document camera and see if all students agree.  9. Ask students for which years the population of foxes was stable (question 5a).

a. ESR: 1970 - 1985

10. Ask the students to discuss with their table group (or elbow partner, whatever is applicable) some factors that the foxes may have had on Santa Cruz Island in order for their population to remain stable during this time period (question 6). Then have students share out 2-3 factors to write in their notebooks.
    a. ESR:
11. Ask the students what it means for a population to be changing (question 7).
    a. ESR: There must be an increase or decrease in the population size.
12. Direct the students' attention back to the graph and ask them to put a circle around the area(s) where the graph is **dramatically** changing (question 8).
    a. Have one student place their graph under the document camera and see if all students agree.

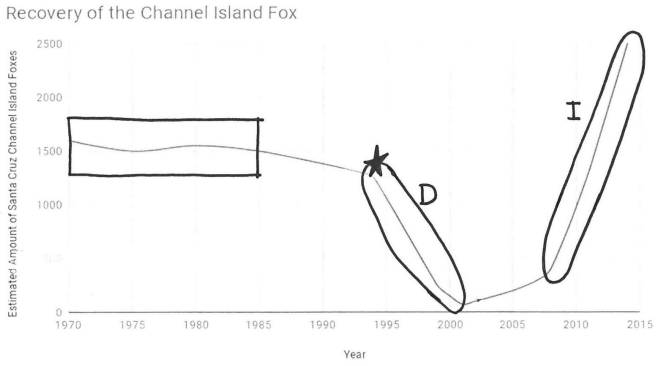


13. Finish answering question 8 with the students.
    a. (8a) Did the number of foxes show a dramatic decrease? ESR: Yes
    b. (8b) In what years was the population dramatically decreasing? ESR: ~1995 - ~2000
    c. (8c) Did the number of foxes show a dramatic increase? ESR: Yes
    d. (8d) In what years was the population dramatically increasing? ESR: ~2008 - ~2014

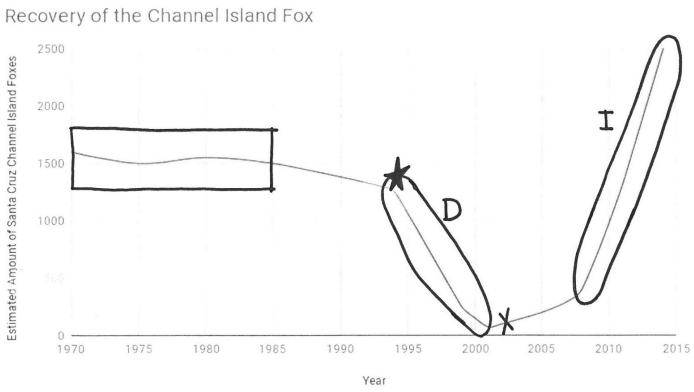


14. Have your students discuss with their table group and come up with 2-3 factors that could have caused the foxes to **decrease** in number (question 9), then share out answers to write into the example notebook.
    a. ESR:
15. Have your students discuss with their table group and come up with 2-3 factors that could have caused the foxes to **increase** in number (question 10), then share out answers to write into the example notebook.
    a. ESR:

16. Have students refer to the graph and tell them that we just listed multiple factors that influenced the fox population. On the graph, put a **star** when you think these factors began to have a significant negative effect on the fox population (question 11).
    a. Have one student place their graph under the document camera and see if all students agree.



17. Have students refer to the graph and tell students that the scientists decided to remove the pigs from the island once they realized the negative impacts they had on the fox population. Put an X on the graph where you think scientists began to remove the pigs (question 12).
    a. Have one student place their graph under the document camera and see if all students agree.



18. Tell students that they will answer questions 13 and 14 on their own.
    a. (13) What do you think would happen if the feral pigs were still alive on the island? Possible student response: The foxes would be an endangered species or perhaps extinct.
    b. (14) Do you think this issue is complex and lead to more argumentation? Why? Possible student response: Yes, there is no one right answer to this question.

19. page:
20.

Example Student Work:
Print out worksheets and fill out with expected answers. You can also include actual student work, or action photos, if you have them.

Name: Nichole

Restoration Channel Islands Debate

Criteria for Debatable Questions

- Must be able to collect evidence
- Cannot be an opinion
- Cannot be a yes or no question
- Must be interesting to population

You will now watch the "Restoration" movie segment about the Channel Islands ecosystem. As you watch the movie, write down some ideas for debatable topics that are brought up in the section below.

Ideas for Debatable Topics

- Should the feral pigs be killed?
- Should the golden eagles be killed?
- Should we only rehabilitate the bald eagle population?
- Should the foxes be allowed to become extinct?

Step 1: As a group, decide on a debatable question from the list on the board, and then write your question on the lines below.

Should the feral pigs be killed ?

Step 2: Within your group, form teams (supporting team and opposing team).

I will represent the (check one): ☑ Support ☐ Opposition

Step 3: In your team, come up with a claim/thesis statement for the side of the argument you are representing.

Your Claim/Thesis statement:
The feral pigs should be killed.

As a class, we will watch the "Restoration" video clip again and in your teams, you will be given a set of articles. From these sources, you will need to collect 3 things:

1. Three reasons that support your claim to the argument and two pieces of evidence to back up each reason.
2. At least two reasons that would support your opponents' claim and at least one piece of evidence to back up each reason.
3. A counterclaim to your opponents' reasons.

Use the space below to take notes on the video and the articles.

Your evidence:
- ~~cost multi-million dollars~~
- the Channel Island Fox Population increased (did not become extinct)
- the pigs were killing native species + eating native species - erosion occured
- to preserve + protect Santa Cruz Island
- ~~another non-native species came in~~

Your opponents' evidence:
- "Though shall not kill"
- species has been on the island for 150 years
- cost multi-million dollars of taxpayer dollars
- pigs were shot + left to rot

Step 4: Caucus as a team to decide on your three strongest reasons that support your claim and the corresponding evidence for each reason. Write them on the lines below.

- I take the position that (your claim/thesis statement) the feral pigs should have been killed
- My first reason for this is because (Reason 1) to save the Channel Island Fox
  - My evidence is that (Evidence A): The population of foxes dropped to a few hundred
  - Also, (Evidence B): After the pigs were killed, the fox population grew to 2,500.
- My second reason for this is because (Reason 2) the pigs were eating vegetation that caused erosion.
  - My evidence is that (Evidence A): "they're" ... "causing erosion + imperilling native species"
  - Also, (Evidence B): "10 rare plant species from extinction" occured after pig eradication
- My third reason for this is because (Reason 3) the archeological sites are being destroyed
  - My evidence is that (Evidence A): "tearing up archaeological sites"
  - Also, (Evidence B): _____

Step 5: Without consulting your opponents, write down what you think your opponents' claim will be for their side of the argument.

Opponents' Claim/Thesis Statement:
The feral pigs should not have been killed.

Step 6: As a team, come up with at least two reasons that you predict your opponents will use in their argument to support their claim, as well as at least one piece of corresponding evidence for each reason. Then fill in your counterargument. The bullet points in boxes are the items that **MUST** be completed.

- Possible Opponents' Claim/Thesis statement The feral pigs should not have been killed.
- ... because (Possible reason 1) of the moral obligation "Thou shall not kill"
  - Supporting Evidence A: no one animal is better/worse than another
    My counterclaim: ~~how do you decide~~ The fox ~~which animal to kill?~~ is native.
  - Supporting Evidence B: how do you decide which animal to kill? My counterclaim: The animal that is native to the island.
- ... because (Possible reason 2) it cost millions of dollars
  - Supporting Evidence A: "being paid for with millions of taxpayer dollars"
    My counterclaim: it was the most humane/safe way to kill the pigs

- Supporting Evidence B: _____
  _____ My counterclaim: _____
  _____

- ... because (Possible reason 3) it was an inhumane way to kill them
  - Supporting Evidence A: ~~shot~~ shot + left to rot _____ My counterclaim: the pigs could bring diseases to the mainland
  - Supporting Evidence B: it was "like a holocaust"
    My counterclaim: humane + methodical
    _____

Let's Have

a Scientific Debate!

You will be paired with another debate group to watch and listen as they debate their question.

Debating Team Rules:	Opposing Team Rules:
1. Each side gets one minute to present (page 3). 2. Same-team partner may whisper in or write notes to each other (on post-its). 3. Opposite side takes notes (page 6). 4. Caucus! This time compare notes and decide which of your opponents' points were strongest- how could you respond to them (page 7)? 5. Each team will have an additional minute to respond with their counterargument (page 7). 6. Shake hands and congratulate each other on a successful debate.	1. Watch each team present for one minute. 2. You should not talk at this time. 3. Take notes on each team's argument (page 8). 4. Discuss the strongest points that each side of the argument presented and write them in your notebooks (page 8). Discuss and write down what each team has done well and things they could improve on (page 8). 5. Listen to the group present their counterargument. 6. Applaud and congratulate each team on a successful debate.

NOTE: If your group is debating second, go to Step 10.

Step 7: Debate your side of the argument by reading out your reasons and evidence in Step 4 (page 3).

When it is your opponent's turn to debate, take notes on their argument using the space below.

- (Opponents' Claim/Thesis statement) The feral pigs should not have been killed
- ... because (Reason 1) it was inhumane to kill them
  - Evidence A: "Thou Shall Not Kill" moral obligation
  - Evidence B: being shot from helicopters + tracked with dogs
- ... because (Reason 2) the Bald Eagle population could have been restored
  - Evidence A: the Bald Eagles keep the Gold Eagles away
  - Evidence B: removal of DDT + breed bald eagles
- ... because (Reason 3) it cost money
  - Evidence A: multi-million dollars
  - Evidence B: taxpayer money funded this

Step 8: Caucus! Use the space below to determine evidence for your counterclaim

defense.

- I respectfully disagree with (Opponents' Claim/Thesis Statement) the opinion, the feral pigs should be killed.
- I respectfully disagree with your first reason because (Counterclaim 1) the pigs were killed in a humane way
  - My evidence for that is (Evidence A): pigs were shot + died immediately
  - Also, (Evidence B): no diseases were spread
- I respectfully disagree with your second reason because (Counterclaim 2) the Bald Eagle population alone would not restore fox population
  - My evidence for that is (Evidence A): the golden eagles ate island foxes + pig offspring
  - Also, (Evidence B): since birds can fly they could continue to return.
- I respectfully disagree with your third reason because (Counterclaim 3) it cost money
  - My evidence for that is (Evidence A): $ a breeding + restoration of foxes cost money too.
  - Also, (Evidence B): a more humane way to kill cost more money

Step 9: Give your counterclaim defense by reading the statements in Step 8.

Shake hands with your opponent and congratulate them on a successful debate.

Step 10: Take notes on your partner group's debate in the box below.

Notes on Support arguments:

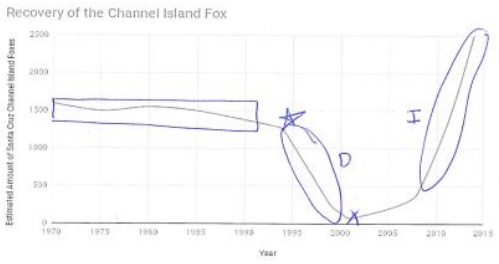
- saved fox population
- saved native plant species
- prevented erosion
- saved archeological sites

Notes on Opposition arguments:

- inhumane way to kill
- cost multi-million dollars
- there were other things like restoring bald eagle populations

Debrief

Use the graph below to answer the following questions.



1. In one sentence, describe what data this graph contains.
   the estimated amount of Channel Island Fox over the years
2. What is the time frame for this graph? 1970 - 2015
3. Why do you think the graph begins in 1970?
   There was no data collected before 1970.
4. What does it mean for a population to be **stable**?
   Stay the same over time
5. Put a **box** around where the population of foxes was relatively **stable** on the graph.
   a. In what years was the population stable? 1970-1990
6. Name 2-3 factors that the foxes must have had on Santa Cruz Island for the for population of foxes to remain **stable** during this time period.
   No golden eagles to eat them + shelter from plants.
7. What does it mean for a population to be **changing**?
   It increases or decreases

9

8. Put a **circle** around where the population of foxes was **dramatically changing** on the graph.
   a. Did the number of foxes show a dramatic **decrease** in population on the graph?
      ☑ Yes ☐ No
   b. If yes:
      i. In what years was the population dramatically **decreasing?**
         1994 - 2000
      ii. On your graph, label this circle with a "D".
   c. Did the number of foxes show a dramatic **increase** in population on the graph?
      ☑ Yes ☐ No
   d. If yes:
      i. In what years was the population dramatically **increasing?**
         2007 - 2015
      ii. On your graph, label this circle with an "I".
9. Think back to the video and articles. Name 2-3 factors that could have caused the foxes to **decrease** in number.
   The golden eagles were eating them easily because they didn't have shelter.
10. Think back to the video and articles. Name 2-3 factors that could have causes the foxes to **increase** in number.
    The feral pigs were removed so the plant shelter grew + the golden eagles were removed.
11. From questions 9 and 10, we know that there were many factors influencing the fox population. On the graph, put a **star** when you think these factors began to have a significant negative effect on the fox population.
12. Scientists decided to remove the pigs from the island once they realized the negative impacts they had on the fox population. Put an **X** on the graph where you think scientists began to remove the pigs.

10

13. What do you think would happen to the foxes if the feral pigs were still alive on the island?
    If the feral pigs were still alive, then the fox population would be extinct
14. Do you think this issue is complex and leads to more argumentation? Why?
    Yes, because different factors affect animal populations

11