Evolution Revolution Workshop

Subjects: Science

 Visual Arts

Grade: 7th (suitable for 6th-8th)

Number of Students: 30

Time: 60-90 minutes

**Standards:**

 **Science Standards:**

 **Life Science**

* SC.7.L.15.1 Recognize that fossil evidence is consistent with the scientific theory of evolution that living things evolved from earlier species.
* Supports SC.7.L.15.2 Explore the scientific theory of evolution by recognizing and explaining ways in which genetic variation and environmental factors contribute to evolution by natural selection and diversity of organisms.
* SC.7.L.15.3 Explore the scientific theory of evolution by relating how the inability of a species to adapt within a changing environment may contribute to the extinction of that species.

**Visual Arts Standards**

 **Historic and Global Connections**

* VA.68.H.3.3 Create imaginative works to include background knowledge or information from other subjects.

**Objectives:**

1. Students will participate and contribute during a classroom discussion about the scientific theory of evolution.
2. Students will define vocabulary terms to support their understanding of the scientific theory of evolution.
3. Students will enact an evolutionary-educational game on their feet in the classroom.
4. Students will demonstrate their knowledge by completing a brief written prompt.
5. Students will watch a brief educational video about one animal and the specific traits its specific evolutionary traits.
6. Students will respectfully and appropriately interact with a live animal to demonstrate the evolutionary traits present in that animal.
7. Students will create an imaginative work of visual art using the background knowledge they have acquired through the workshop.

**Materials:**

1. Projector with internet access and sound.
2. White board with markers
3. “Chips” for the evolution game
4. Lined paper and writing utensils to complete the written prompt
5. Live animal guest
6. Art supplies and copy or construction paper

**Introduction:**

Immediately engage students to the idea of learning science through the arts and introduce them to myself and the topic of evolution. There will also be a brief explanation of the events and activities that will be presented through the workshop.

**Activities:**

1. Lead the students through a brief physical, vocal, and mental warm up such as “no bananas” and a short yoga-inspired stretch.
2. Define the theory of evolution, fossil evidence which supports it, genetic variation, environmental factors, natural selection, diversity of organisms, and extinction through a classroom discussion.
3. Re-arrange the space and get students on their feet to participate in the Natural Selection Game. (details on following pages)
4. If time, allow students to write a brief response to the written prompt. (prompt on following pages)
5. Play a brief educational YouTube video from the Paige’s Planet YouTube channel about our animal guest for the day.
6. Allow students to meet and interact with the animal guest under strict guidance, displaying some of that animal’s evolutionary trait that has made it successful within its environment.
7. Pass out art supplies and encourage students to create their own animal (one that doesn’t already exist) with traits to be described on the back and displayed in their picture. These traits should help it thrive (find specific food, navigate the terrain, adapt to temperate, etc.) in a certain environment they choose from a provided list.
8. If time allows, allow student to share their animals with the class.

**Closing:**

Thank students for their participate and encourage them to continue to engage with Paige’s Planet on YouTube.

**Natural Selection Game**

In this activity participants will take on the role of a population of foraging animals. Individuals will vary in their ability to move while foraging and participants will observe how the population evolves by natural selection as the game progresses.

**Steps:**

1) Inform the participants that they will be taking on the role of a population of foraging animals trying to feed on tokens (for the games purposes these tokens can be practically anything, poker chips, checkers, easter eggs, etc.).

2) Participants will vary in how they are able to move while foraging for tokens. The three movement types are:

Walkers (can move normally)

Heel-Toe-Walkers (must walk with each step placing the heel of one foot directly in front of the toes of the other foot)

Hoppers (can only move by hopping with their legs together)

Divide the students into these three movement types, for best results it is recommended to start the game with only a very small number of walkers. This allows you to suggest that walkers are a new mutation in the population (and as such start out with low numbers) and the class will observe how/whether this mutation will spread through the population.

3) Have the students line up along the edge of a designated game area (the size of the area used will depend on the number of participants).

4) Randomly distribute the tokens within the game area, try to avoid large clumps of tokens. For best results the number of tokens you distribute for the game should be 2X the number of participants.

5) The game takes place over the course of 4 rounds, which can be described as 4 generations. During a round participants will have 20 seconds (the time may be adjusted depending on the size of the game area) to collect as many tokens as possible while maintaining their assigned movement type.

6) Participants that collect at least 2 tokens are able to gather enough food and survive, those who collect less than 2 die and move to the side of the game area designated as the dead zone.

7) Participants that collect 4 or more tokens are able to reproduce. To reproduce a participant brings a “dead” player from the dead zone back into the game, this revived player now becomes the same movement type as the player that reproduced. After reproduction, take a count of the different movement types (have students record this data in the Game of Selection worksheet).

8) Repeat steps 5-7 for the remaining rounds/generations. At the completion of the game take a final tally of the number of each movement type and record the data.

9) Have participants graph the change in movement types within the population over the generations of the game.

10) Optional follow-up discussion: Have participants discuss how each of the key elements of natural selection (variation, selection, heredity) was present in this game.

**Written Prompt**

There were two types of rabbits that were created. One type of rabbit can only eat berries. The other type of rabbit can only eat greens (leaves and grass). Unfortunately, in Rabbit Haven Forest there was a drought. The plants did not receive enough water to flourish as they normally do. The plants could only grow their leaves and did not have enough energy to produce the berries.

* Write about what will happen to the two types of rabbits in Rabbit Haven Forest. What will happen to the rabbits that eat only greens? What will happen to the rabbits that eat only berries? Which type of rabbit will grow best and be able to reproduce?