Nurdles- A disruption in the food chain

For this activity students will participate in an interactive food chain game in which they will observe and identify the different trophic levels within that chain. In addition, the students will discuss the effects humans have on an ecosystem and its food chains.

Audience: 3-5

Student Outcomes:

- Students will demonstrate the flow of energy throughout a food chain/web.
- Students will identify the effects nurdles can have on a food chain/web.
- Students will be able to classify the feeding roles of different organisms found in an aquatic ecosystem.

Teacher Background:

The Great Nurdle Hunt- problem with nurdles
Nurdle Patrol - Home
Nurdle Fact Sheet

Materials:

- Cup/bag
- Tokens or any other manipulative
- Paper
- Pencil
- Colored pencils
- Large area (free of any trip hazards)

Teacher Prep:

Prior to starting the activity, you will need to write a number on the underside of the cup or paper bag. This number will represent the number of consumed nurdles at the end of the activity. Choose numbers between 0-30. You can include a couple of zeros. Note: Do NOT draw attention to the numbers. The number will not be discussed until the end of the activity.

Introduction:

Start off by having the students brainstorm for 5 min on a sheet of paper all the organisms they would find in an aquatic ecosystem. It is recommended, but not required, to have them brainstorm an aquatic ecosystem that is local. This could be freshwater or saltwater depending on your location.
After 5 minutes have passed, have students share out their answers and add them to a class chart. Once most ideas have been recorded on the chart begin to draw lines to connect all the food chains that make up the food web. Ask the students to think about

what animal they would want to be from the web that was created and why. Have a few students share what their choice was.

Procedure:

1. Inform the students that today they are going to focus on 1 food chain that is found within the intertidal zone.
2. Students will be playing a game. This game is ideally played with a larger group, so if your class size is small you may want to combine with another teacher or make sure that your “Life Cards” are proportionately distributed based off your class size. You will want to use 55% of zooplankton to other animals.
3. Begin by telling the students that they are going to be playing a food chain game.
4. Each student will get a “Life Card.” They must read these quietly and do not share with others. Each card is different and tells the students what they are supposed to do.
5. Designate a space in the classroom as “HOME” for your saltwater ecosystem. Make sure that it is easy for the group to move around in. Another option would be to have the class go outside to a blacktop area where there is more space for movement.
6. For this next part you may have to get resourceful based on what is available at your campus. You will want to use tokens. Spread the tokens on the floor of the area that is designated as your ecosystem home. This will represent phytoplankton (producers). Ask the students what trophic level this represents?
7. To start the game off have your Zooplankton make their way “HOME.” Each of them should have a paper cup or brown bag. They will have 10-15 seconds to feed on the phytoplankton. The trick is they can only pick up one piece of phytoplankton at a time. That means they will have to bend over, grab a chip, stand back up and place it in their cup, then repeat. When the timer goes off, the zooplankton will stop feeding.
8. Ask the students who they believe is next in the food chain. Call over the small fish to join the zooplankton. For this next round the zooplankton will **continue to feed** on the phytoplankton **BUT** the small fish are now feeding on the zooplankton. The small fish must follow what is on their “Life Card.” In order to eat the zooplankton, they must tap them on the elbow. If a zooplankton is caught, they must hand over their bag of phytoplankton. This will take place for 10-15 seconds. This time when the time is up the zooplankton will return to their seats with their bags if they have any.
9. Ask the students who would be next in the food chain. (bird). The birds now join the group. They will have 10 seconds to eat the small fish. They will symbolize eating the small fish again by tagging the person's elbow. At the end of the 10 seconds all the small fish, tagged or not, return to their seats with their bag or cup if they still have any.

10. For the final round have the coyote join the group. Ask the students what level of the food chain the coyote represents (top of food chain). The coyote will tag the birds on the elbow and take their cup or food bag.
11. For conclusion of the activity have all students return to their seats. Have the students look at the bottom of their cup/bag. If some students do not have a cup/bag have them look on or join someone else who does. Each student with a cup/bag will need to add up the numbers on the bottom of their cup/bag. This number reflects the number of nurdles consumed that made their way up the food chain.
12. At this point your kids are asking you what is a nurdle. Pull out your vial of nurdles to show to the class. You should have several of them to pass around. Refer to the teacher background section for explaining what a nurdle is.
13. Take this time to discuss a reflect. Some suggested questions are listed below

Questions/Discussion:
Which trophic level do you think the nurdles were first introduced into the food chain?
What are some things the nurdle could have been mistaken for? Ex: seeds, sargassum bulbs, vegetation, fish eggs.
What effects could nurdles have on the animals? Food chain? Environment?
What can be done to stop the spread of nurdle pollution?

Extensions:
Math:
As a class, compile the data collected in this activity into a data table.
Using the data table students will create a bar graph. Once students have created their bar graph discuss any observations or conclusions that can be made.

Suggested read aloud books:
Who eats what? By Patricia Lauber
This is the Sea that Feeds Us

Zooplankton You come across a bunch of phytoplankton and it's a feeding frenzy! You only have a little bit of time to graze before the current carries it away. Grab everything you can to get those nutrients Place the phytoplankton that you find in your food bag.	**Zooplankton** You come across a bunch of phytoplankton and it's a feeding frenzy! You only have a little bit of time to graze before the current carries it away. Grab everything you can to get those nutrients Place the phytoplankton that you find in your food bag.
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Fish You come across a swarm of zooplankton, but you have already fed on some vegetation on the nearby jetty. You are not that hungry and only eat 1 of the zooplankton. Take the bags of zooplankton that you caught.	**Fish** You come across a swarm of zooplankton, but you have already fed on some vegetation on the nearby jetty. You are not that hungry and only eat 1 of the zooplankton. Take the bags of zooplankton that you caught.
Fish You come across a swarm of zooplankton. You were able to catch 2 of them. Take the bags of zooplankton that you caught.	**Fish** You come across a swarm of zooplankton. You were able to catch 2 of them. Take the bags of zooplankton that you caught.
Fish You come across a swarm of zooplankton. You decide to feast on them, so you eat 3 in one dive through the swarm. Take the bags of zooplankton that you caught.	**Fish** You come across a swarm of zooplankton and while feasting you did not see the marine debris that was mixed in. You now starve because nurdles have filled your stomach and they offer no nutritional value to your body. Do not take any bags. You may sit down. You did not survive and have washed up onto the beach.

Bird You spot a school of fish-eating zooplankton. You were distracted on the shore by the sargassum bulbs, so you were a little late to the feeding and only caught 2 small fish. Take the food bags of the small fish that you caught.	**Bird** You spot a school of fish-eating zooplankton. You were patiently waiting so as they came closer you were ready to jump right in and feast. You were able to catch 4 of them. Take the food bags of the small fish that you caught.
Bird You spot a school of fish-eating zooplankton. You were working on prying open a clam on shore, so you showed up late. However, because of your speed you were able to catch 3 small fish. Take the food bags of the small fish that you caught.	**Coyote** While on the prowl you spot a flock of birds. You chase after them and successfully catch 2 for your meal. Take the food bag from the birds that you caught.