

MARSH MUNCHIES

OVERVIEW

Food is essential for survival. Animals use calories and nutrients from the food they consume for energy and to build body tissues. However marine debris can affect the ability of animals to feed, and is a threat to our marine environment. This is a game to show how much energy a marsh animal needs to carry out daily activities and how marine debris can affect their lives.

OBJECTIVES

Following completion of this lesson, the students will be able to:

- Understand that animals must have food to survive
- Food sources are varied and limited
- Realize that marine debris is a critical issue that affects every living creature.

GRADE LEVELS

3RD -12th grades

NJCC STANDARDS

Science Indicators:

5.1: End of Grade 4: A1, A2, B1, B2; **5.3:** End of Grade 4: A1, B2, D1;

End of Grade 8: A3; **5.4:** End of Grade 4: B1;

5.5: End of Grade 2: B1; End of Grade 8: B2; **5.7:** End of Grade 2: A2;

End of Grade 4: A1, A2; End of Grade 6: A1, A2; **5.8:** End of Grade 2:

B1, A3; End of Grade 4: A1, C1; **5.12:** End of Grade 2:A1; End of Grade

4: A1, B1; End of Grade 6: B1.

Mathematics Indicators:

4.1: 6A5, 6B1, 6C3; **4.2:** 2C1, 2D1, 2D2, 2D3, 4D1, 4D2, 4D4, 4D5,

6D5, 8A5, 12A4; **4.3:** 12C1; **4.4:** 2A1,2C1, 4A1, 4C1, 6A1, 6A2, 12A5;

4.5: A2, A3, A4, B1, B2, B4, C1, C2, C3, C4, C6, D2, D3, D5, E1, E2,

F1, F2, F4, F5

MATERIALS

- 110 poker chips or 1-inch colored paper squares: 50 white, 30 blue, 20 green, 10 red,
- Marsh Munchies activity cards (one per student),
- Marsh Munchies game card,
- Marsh Munchies food value chart

PROCEDURES

Have students share what they know about **calories**. Explain that **calories** indicate the amount of potential fuel in the food- when you eat high caloric food you have more fuel to burn. Explain what would happen if a person ate too many (fatten up) or few **calories** (no energy).

Discuss what foods are good for us; identify the food groups and essential **nutrients** needed in our foods. Tell students they will take on the role of an imaginary wild animal living in the marsh. Discuss how wild animals all need to find their own food for survival, there are no grocery stores. Ask what activities and challenges animals are faced with everyday that all require **energy**.

Discuss the challenge animals have in dealing with marine debris, such as animals mistakenly eating a piece of plastic thinking it is food, or entrapment in floating debris. How could marine debris affect the ability of animals to find enough food? What could happen to animals that mistakenly ate piece of Styrofoam or plastic fishing lure?

Explain that the game will show how much energy an animal needs to carry on daily activities and the effects pollution has on animals trying to survive. This game is for 25-30 students; the setting may be on a clear floor area in the classroom, gym, or outdoors, which will represent the marsh.

Note: Caloric amounts used in this activity are not meant to be considered as actual "true" caloric requirements. Rather they help a student make comparisons in the exercise.

The poker chips or squares represent the different foods available to a marsh animal; see the chart for food values.

- A **red chip** is one extremely large meaty piece of fish, and 2 nice sized crustaceans. These munchies are worth 200 calories per chip.
- A **blue chip** is 2 medium mollusks, and 1 crustacean. This is worth 100 calories per chip.
- A **green chip** is a big gulp of plankton and a stalk of salt meadow hay; this is worth 50 calories per chip.
- The **white** chip is 1 small fish worth 25 calories per chip.

Explain how there will be less of more coveted food items worth more calories and how food worth little calories are usually more abundant. Discuss a food pyramid and how more smaller animals are needed to sustain the larger animals that will need more food to survive.

Round 1: toss the chips out onto the floor or field so they are scattered widely. This represents the food that can be found in the marsh. Tell the students in order to survive and complete daily activities they must at least collect 250 **calories**. On the word "Go" all students have 30 seconds to eat (collect chips) as much as they can. Call "Stop" when the time is up. Have each student calculate the total **calories** he or she has just gathered and record the figure on the game card.

Have students calculate their surplus or deficit, depending on whether or not they had any **energy** left over or did not have enough. Those who have a surplus have stored **energy** for more activities (or if they are lazy marsh animals they will get fat). Those who had a deficit are weak animals; however they must give up 75 calories for **energy** to go back out into "marsh" to find enough food to make up the deficit. All students should go back out and collect enough chips (calories) to survive. Then collect all the chips to move on to round 2.

Round 2: Repeat round one, except this time hand each student an activity card after they have returned with the chips.

Have students calculate the total number of **calories (energy)** needed for the activity on the card plus the 250 **calories** for daily activities. Give them time to figure out how many chips they have and if they possess enough to complete the activity. Then have them read their game cards aloud and turn in the appropriate number of chips. If the student has not collected enough, he or she did not complete their activity. Ask students

why they may not have had the right amount of **energy** for some the activities. Explain that they did not eat enough food or the right kinds of food. Also, they didn't know in advance how many extra **calories** were needed so they did not eat correctly. Do animals in the wild know exactly how much food they will need to consume in a day? If there is no food left at the end ask why. Introduce the idea that food is a limited resource and not always easy to find. Students will begin to realize that survival in the marsh is not very simple.

Round 3: Hand out activity cards before searching for food and ask students to read theirs aloud. Also, this time give students hindrances (e.g. Use medical tape around hands to bind fingers together, as if a fishing line or six-pack ring got caught around an animals mouth/beak) to represent how marine pollution affects the ability of animals to feed in the marsh. Secretly make one of the chips worth 0 calories, tell the students after they have collected their "food" that they have accidentally ate pollution, such as a piece of plastic that many marine creature mistake as food. Repeat the game.

Students should have a difficult time collecting and finding enough "food" for survival with their hindrances and will begin to recognize that marine debris is a severe problem that threatens the lives of marine animals.

Calories are a way of measuring how much energy a certain food possesses, and the amount of energy the body uses. Burning of **calories** is the body breaking down food molecules to release the energy stored within them, this is what gives us the fuel to live. The body stores energy it does not need in the form of fat, for future use if needed. All animals need a great deal of **calories** and **nutrients** to stay healthy and active. Many animals need an amazing number of **calories** daily to build and maintain its shelter, find and eat food, swim, walk, sleep, mate and/ or rear young, watch for predators and flee when necessary, and so on. Animals in the marsh eat everything from the grasses, plankton, other aquatic animals, and even dead animals. Nothing goes to waste.

During severe food shortages, many animals are known to eat each other! Various activities require different amounts of energy. For example, you will burn more calories outside playing tag rather than inside playing video games.

During high tide water flows into the marsh bringing **nutrients**, food and also marine **debris**! The small enclosed areas of the marsh and its tall grasses trap the debris and help keep the debris from floating freely in an open body of water. The debris is unsightly and a threat to life in the marsh. Turtles and fish confuse plastic bags or balloons with food, plastic can cause the animals to choke or cause damage to internal organs. Marine birds mistake pieces of trash for food, feeding it to their young, which in turn deprives the young birds from **nutrients** that are needed and give them a false sense of being "full." Many marine mammals and fish die each year from become entrapped or strangled by plastic fishing gear, or six pack rings.

VOCABULARY

Calorie- energy producing value in food; measurement of heat contained in food that the body uses to produce energy.

Energy- having power to do work

Nutrients- a nourishing ingredient in a food helps to promote growth.

Debris- improperly discarded trash or litter scattered about.

EXTENSIONS

Skip round three; instead discuss conservation and how food sources are limited in the wild. Without discussing a better plan for collecting food, toss out half the chips. Add a new rule- for each chip that is left in the marsh, two more chips will be added of the same color for the next round. Play again two more times is best. The new rule should bring about changes in behavior. Fewer chips should have been taken these rounds. Students should become more conservative and thoughtful of others, realizing their **conservation** efforts were rewarded by additional food sources. This version of the game will help students understand the concepts of resource limitation and cooperative conservation. Have students write a short report about possible solutions and what they can do themselves to help reduce the amount of pollution and marine debris found in our environment.

REFERENCES

Adapted from “Marsh Munchies” WOW! Wonders of Wetlands, Environmental Concerns, PO Box P. St Michaels, MD 21663.

United States Environmental Protection Agency Region 2: NJ, NY, PR, VI. FACTS “Plastic Litter Kills!” 26 Federal Plaza New York, NY 10278.

REV. 3/22/09



The New Jersey Marine Sciences Consortium/New Jersey Sea Grant (NJMSC/NJSG) is an affiliation of colleges, universities and other groups dedicated to advancing knowledge and stewardship of New Jersey's marine and coastal environment. NJMSC/NJSG meets its mission through its innovative research, education and outreach programs. For more information about NJMSC/NJSG, visit njmsc.org.



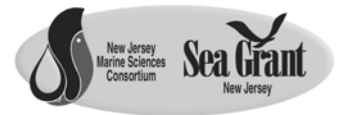
MARSH MUNCHIES GAME CARD

	Round 1 <i># Calories</i>	Round 2 <i># Calories</i>	Round 3 <i># Calories</i>
Total Consumed			
Total Needed			
Surplus			
Deficit			



MARSH MUNCHIES FOOD VALUE CARD

Color Chips Collected	Food Eaten	Value (in Calories)
RED	1 Large meaty piece of fish + 2 Nice sized crustaceans	200 Calories
BLUE	2 medium mollusks + 1 Crustacean	100 Calories
GREEN	1 Big gulp of plankton + 1 Stalk of salt meadow hay	50 Calories
WHITE	1 Small Fish	25 Calories



MARSH MUNCHIES ACTIVITY CARDS

Watch Out!

You are happily munching away on some marsh munchies when you spot the shadow of a hawk flying overhead! You look around frantically for a place to hide, you run for the closest creek, dive in, and hold your breath until the hawk goes away. You used up **400** extra calories that day for this whole ordeal.

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Snack Time!

You're sick of eating the same old munchies! To supplement your diet you go fishing for something new to eat, as you look for the food in the marsh, you swim back and forth for a total of 40 yards. You catch four yummy worms worth 25 calories each. That wasn't worth the energy expended to catch them; you wasted **300** extra calories that day.

Supper time!

You swam through the marsh to find the best of munchies to eat. You covered an extra 45 yards to fill you up, and you used 10 calories per yard. That's a total of **450** extra calories you expended to get that good supper.

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Brrrr!!

Its winter and you're freezing! You're snuggled in you sleeping lodge with you mate and young cuddled around you. Usually that's enough to keep you warm, but tonight it's colder than usual outside. As you lie there shivering you use up 50 calories per hour. The sun won't come up for another 6 hours, that's **300** calories you shiver away!

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MARSH MUNCHIES ACTIVITY CARDS

Building a City

You decided to move to a new section of the marsh, since you're buddies ate all the munchies in the old part. It took 200 calories to excavate the space, 200 calories to find the materials, and 200 calories to build the new home. An extra 600 calories was used to build your new home.

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Home Maintenance

You needed to make some home repairs. To fix up your home you had to find cordgrass and driftwood, an activity that used up 150 calories. Making the repairs used up an extra 200 calories. 350 calories was used to make all the repairs on your home.

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Courtship

After 3 days of courting, you've found your perfect match! It took a lot to get this critter interested in you to become your mate. In fact you spent 400 calories to bring gifts and show off to win your mate over.

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Swimming

You decided to have a little fun and take a nice refreshing swim. You swim over to a part of the marsh unknown to you, and you get stuck in the waters between the tides. Your fun little swim ends up taking over 3 hours. You used up 450 extra calories until you finally made it home.

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MARSH MUNCHIES ACTIVITY CARDS

Kids!

Now that you have a mate, you will have a family, and you must build a nursery for the young.

Building a nursery used 300 calories to cut and find materials, 300 calories to build the nursery.

Whew! That's a lot of work! It took 600 calories to complete the nursery for the young.

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It's a Miracle

You and your mate have 5 little ones! Every day you must feed and care for each of the young. It takes 60 calories to feed each one, and 250 calories for the extra protection the young need.

That's 550 calories spent on childcare each day.

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Teach Your Children

You're young are weaned. Now you will need to teach them how to get their own food. This takes 90 calories per child. You have 5 young! You need 450 extra calories to teach all of your young.

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Spending Energy to Get Energy

Finding food and eating uses energy too. You use 100 calories to gather and eat breakfast, 150 calories for lunch, and 250 calories for dinner. You used 500 calories in a day just to get fed!! (You better eat a lot more to do anything else!)

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