Cornell Institute for Biology Teachers

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Title: **Teeth Unit**

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Appropriate Level: Grades 2-7

NYS Standards* **1-Analysis, Inquiry and Design**: 1- Purpose of Scientific Inquiry: 1.1a, 1.3a; 2- Research plan, hypotheses: 2.1a, 2.3a,b; 3- Analysis of results: 3.1a, 3.2a, 3.4a; **3- Mathematics:** 4-Modeling: 4.2, 4.3; **4- Living Environment:** 3- Change over time: 3.1a, 3.2b.

Abstract: Students will investigate the characteristics of teeth and what teeth can tell about an animal's lifestyle:

- Students will sort and categorize 10 or 12 teeth.
- Given information about what canines, incisors and molars are, students will identify which teeth are which and why. They will predict which teeth came from what animal.
- Students will compare the given teeth to their own, decide what kind of teeth they have and which teeth are used to eat which kinds of food.
- The unit will conclude with a study of jaws from carnivores, herbivores and omnivores. Based on the teeth structure, students will hypothesize which jaws belong to which type of animal.

Special Materials: CIBT Teeth Kit

Time Requirement: 8-10 class periods (without extensions)

* see appendix for complete description of standards.

Additional Teacher Information

Objectives

- Students will identify different teeth by function, size and shape.
- Students will be able to identify canine, molar and incisor teeth.
- Students will study their own teeth, identify which are canines, molars and incisors and which are used to eat what food.
- Students will be able to identify carnivores, herbivores and omnivores by studying their teeth. Students can tell what an animal eats and possibly where and how it lives by studying its teeth.

Teacher Preparation

Need to make agar petri plates. See information sheets in Activity Four.

CIBT Kit Contents

The CIBT Teeth Kit contains the following materials.

- Animal teeth – five examples of each kind. Skulls Unlimited, www.skullsunlimited.com, 1-800-659-SKULL.
- 60 petri dishes (60X15mm, VWR catalog # 25384-060, or other general scientific supply companies.)
- Oven mitt
- Ten washable markers
- Ten metric rulers
- Ten small mirrors

- Teeth books (one copy of each unless otherwise stated):

  What Big Teeth You Have by Patricia Lauber. Scholastic, Inc., 1993.
  Good information about teeth including description of incisors, canines and molars. Fourth grade reading level.

  12 copies of *How Many Teeth* by Paul Showers. Let's Read and Find Out About Science series, Harper Collins Publishers, 1991.
  Second grade reading level. Excellent source of information for students. See Activity Two.

  Throw Your Tooth on the Roof: Tooth Traditions from Around the World by Selby B. Beeler.
  May only be available in hard cover.

  Grandpa's Teeth by Rod Clement. Harper Collins Publishers, 1997.
  Find out where Grandpa's lost teeth were.

  My Loose Tooth. Random House 1999.
  Step into Reading Level 1. Rhyming story about how to get a loose tooth to come out.

Student Resources

Teeth, Tusks and Fangs (Young Discovery Library) by Roger Dievart
Good source of information on physiology, uses, types and care of human and animal teeth, tusks and fangs. Third grade reading level.

Teeth and Tusks (Head to Tail) by Theresa Greenway

Dragon Teeth and Parrot Beaks: Even Creatures Brush Their Teeth by Almute Grohmann

Teeth Unit
New York State Learning Standards

Standard 1: Analysis, Inquiry and Design

Key Idea 1: The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.

1.1- The central purpose of scientific inquiry is to develop explanations of natural phenomena.

1.3- Develop relationships among observations to construct descriptions of objects and events and to form their own tentative explanations of what they have observed.

Key Idea 2: Beyond the use of reasoning and consensus, scientific inquiry involves the testing of proposed explanations involving the use of conventional techniques and procedures and usually requiring considerable ingenuity.

2.1- Develop written plans for exploring phenomena or evaluating explanations guided by questions or proposed explanations they have helped to formulate.

2.3- Carry out their plans for exploring phenomena through direct observations and through the use of simple instruments that permit measurement of quantities, such as length, mass, volume, temperature and time.

Key Idea 3: The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.

3.1- Organize observations and measurements of objects and events through classification and the preparation of simple charts and tables.

3.4- Adjust their explanations and understandings of objects and events based on their findings and new ideas.

Standard 3: Mathematics

Key Idea 4: Modeling/Multiple representation – Students use mathematical modeling/multiple representation to provide a means of presenting, interpreting, communicating and connecting mathematical information and relationships.

4.2- Construct tables, charts and graphs to display and analyze real-world data.

4.3- Use multiple representations as tools to explain the operation of everyday procedures.

Standard 4: The Living Environment

Key Idea 3: Individual organisms and species change over time.

3.1- Describe how structures of plants and animals complement the environment of the plant or animal.

3.2- Observe that the differences within a species may give individuals an advantage in surviving and reproducing.

Introductory Activity: What do you know?

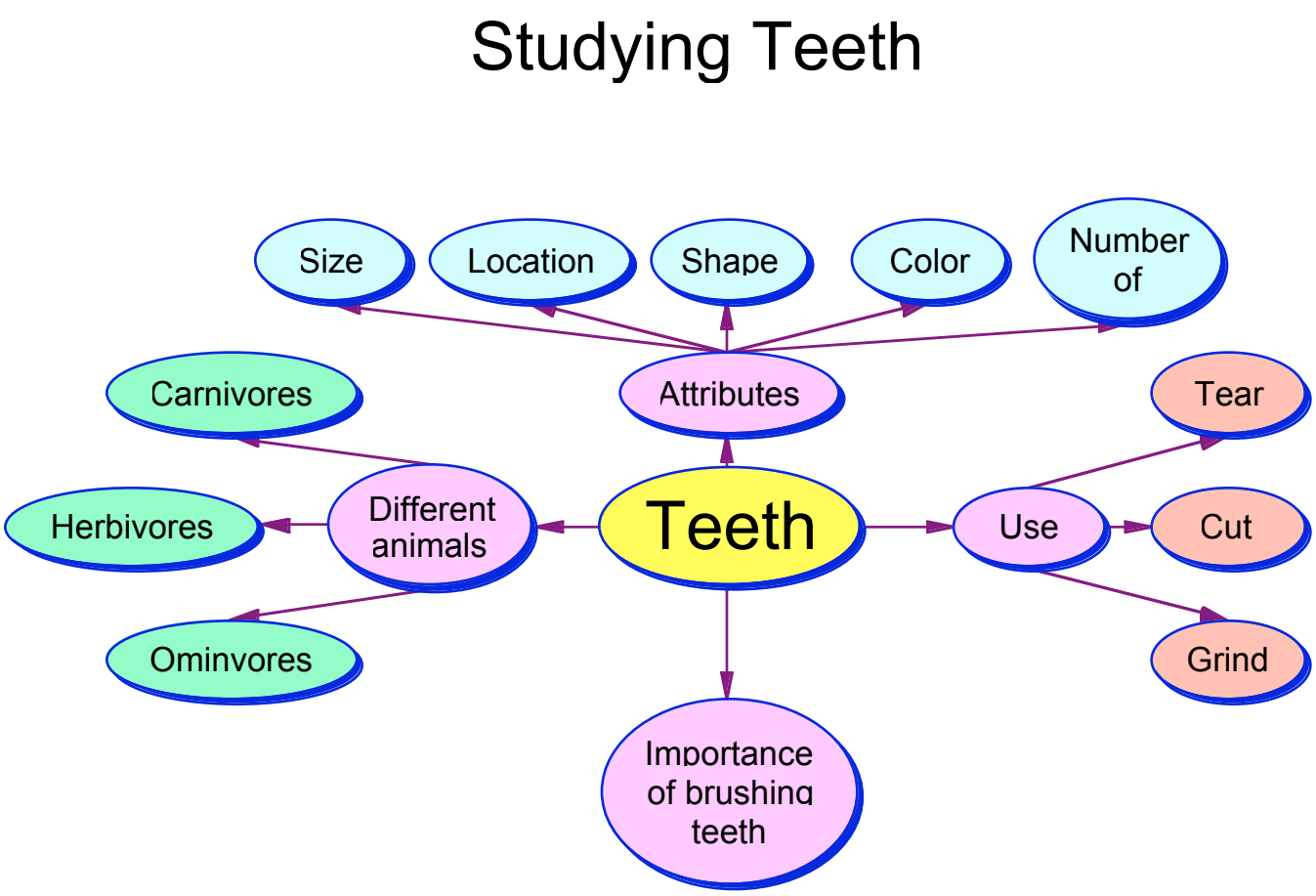
Purpose

Find out what students already know about teeth and what questions they might have about teeth.

Procedure

1. Use semantic mapping to illustrate information students know already about teeth. (The map below was done using the computer program Inspiration and is used only as an illustration of what your students might come up with.)

2. List questions students have about teeth, both their own and in different animals. (Mapping often contributes questions since students disagree about information on a subject.)



Activity One: Oh, What Big Teeth You Have!

Purpose

Students will examine a group of teeth and sort them based on size, shape and function. Students will be able to identify canines used for tearing, incisors used for cutting, and molars used for grinding.

Procedure

1. Students will be divided into groups of about four.

2. Each group of students will be given a number of assorted teeth (including canines, molars and incisors from a representative group of animals).

3. Students will sort the teeth into groups based on a common characteristic that they define. The teacher will circulate among groups and check for understanding; for example, point to a tooth and ask why it is included in a particular group. The teacher may need to help students think of such characteristics as size, shape and function.

   Optional: Students leave their teeth and move to another group's set of teeth. They try to tell what criteria the previous group used to sort the teeth.

4. Students will describe the different shape and size of each tooth and measure the length and width of each tooth. Brainstorm as a class different words that would describe the shape of the teeth. Then have students, working alone or possibly in pairs, do the first worksheet.

5. Ask the students to identify the top and bottom of each tooth. They may need help in this. Some discussion of roots of teeth may be appropriate here. Note to teachers: the code of each tooth is on the bottom or root.

6. Students will identify which teeth have a point similar to a pencil, are flat with ridges and large roots or have a sharp edge similar to a knife or a scraper. The teacher will introduce the corresponding scientific names: canines, molars, incisors.

7. Students will complete the second worksheet stating what kind of tooth each is (canine, incisor, molar) and why.

8. As a follow-up activity, students will be given a list of names of animals from which the teeth came. For each tooth, students will hypothesize what animal it came from and give reasons for their choice. (See the third worksheet.)

9. Students will use a Venn diagram to show differences and similarities among the three kinds of teeth. (For example, all three are teeth; incisors and canines are sharp; molars are flat.)

10. See Teeth Code sheet to identify teeth.

Teeth Identified by Code

A cow molar

B beaver incisor

C coyote molar

D bear canine

E cow incisor

F bobcat canine

G coyote canine

H bobcat molar

I horse molar

J coyote incisor

Name _____ Activity One – Worksheet One

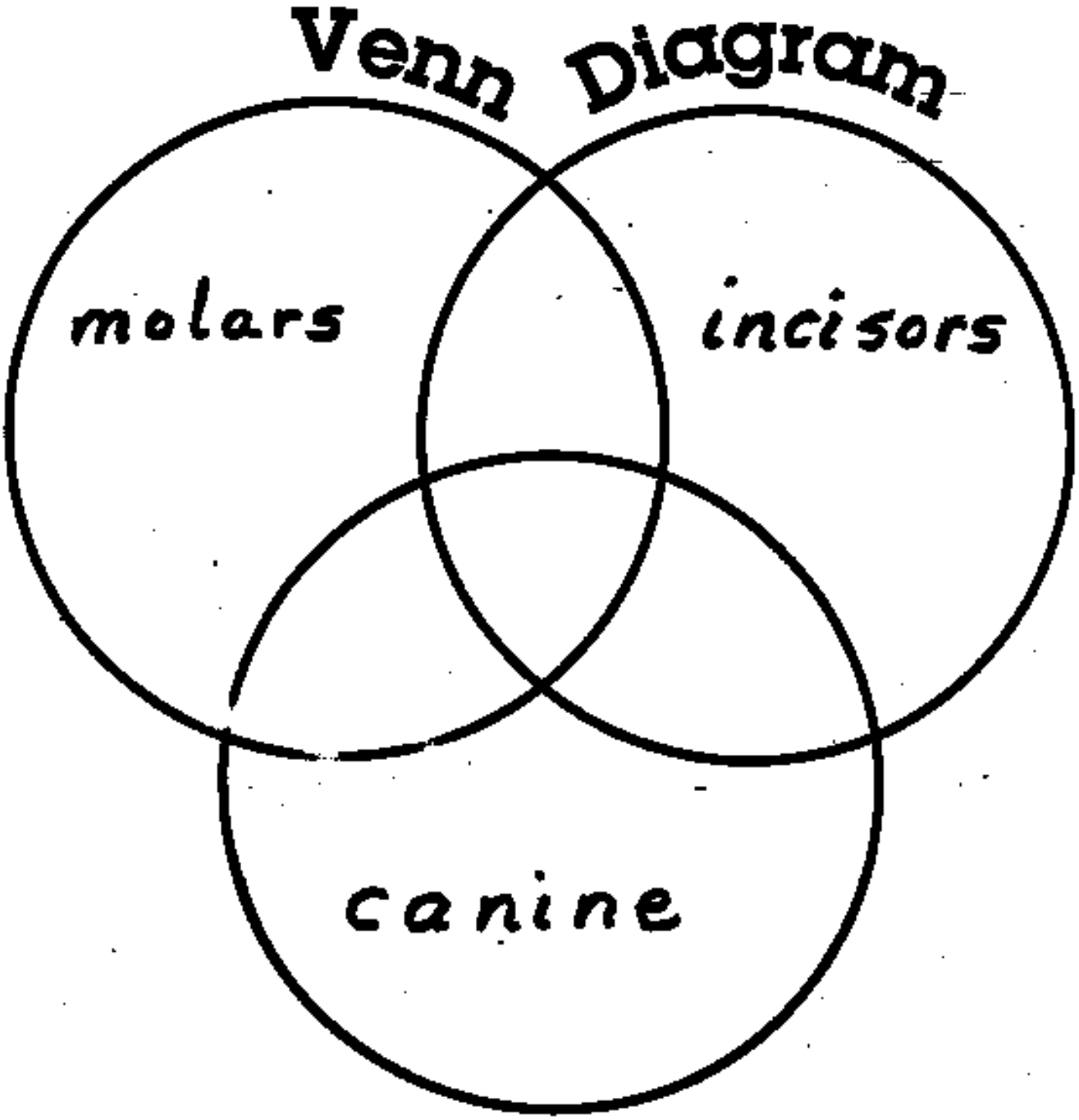
Code	Draw a picture.	Describe the shape.	Measure width in cm.	Measure length in cm.

Name _____ Activity One – Worksheet Two

Code	What kind of tooth is it (canine, molar, incisor)?	Tell why.

Name _____ Activity One – Worksheet Three

Code	What kind of animal is it from?	Tell why.


Venn Diagram
molars
incisors
canine

Activity Two: What Are My Teeth Like?

Purpose

Students will count their own teeth and graph class teeth data. Then they will try to identify canines, incisors and molars based on the information gained in Activity One.

Materials

- Coffee Stirrers or Q-tips
- Mirrors (one per group)
- *How Many Teeth* book

Procedure

1. Students will predict how many teeth they have.

2. Students will count how many teeth they have and graph the class data about teeth. Using a coffee stirrer or Q-tip to touch each tooth as they count may help.

   If working with high school students, have elementary students count how many teeth high school students have. Is it more or less? Why?

3. Class discussion – students will answer questions about the class data:

   How many more students have 18 teeth than 16 teeth? (or similar questions)

   What is the most common number of teeth?

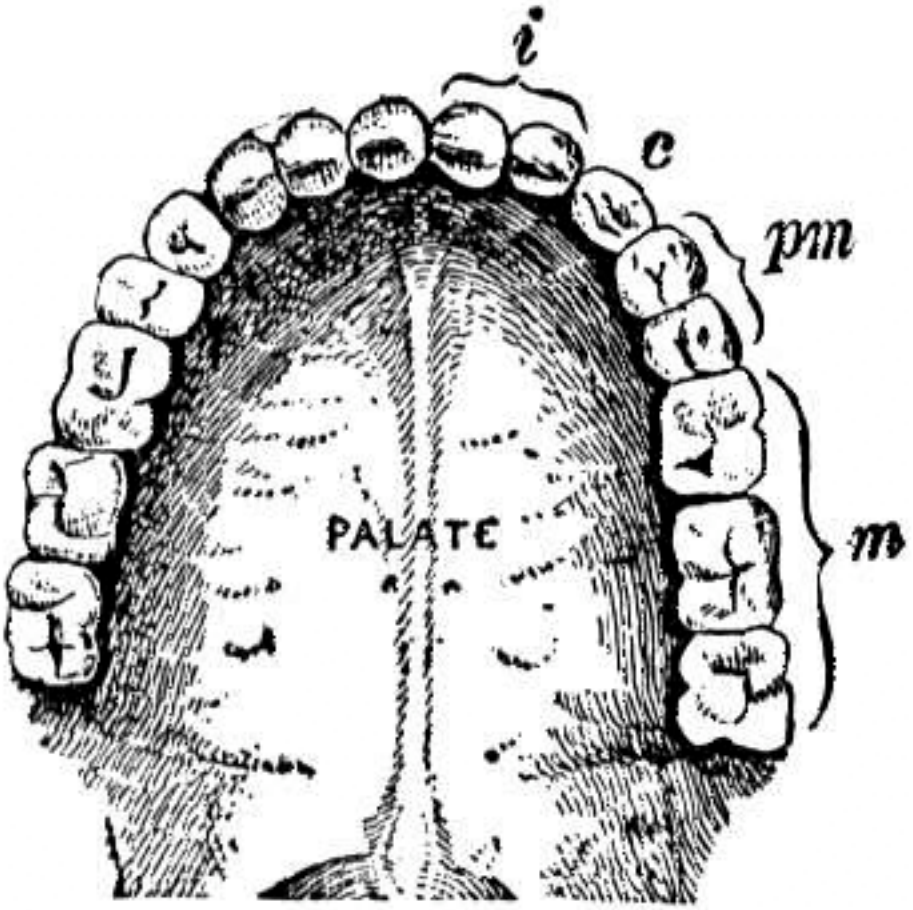
   Why do you think some students have more/less teeth?

4. Have students read book *How Many Teeth?* by Paul Showers to confirm how many teeth children and adults have.

5. Ask students: Do humans have the same kinds of teeth as we studied in Activity One? Can you find any canine teeth? Why do you think they are canine? How about incisors? Why do you think some of your teeth are incisors? How about molars?

   Students will need mirrors. They also will probably need assistance identifying the kinds of human teeth. High school students could be helpful here or the teacher could provide further information or diagrams about human teeth.

   Have students label a diagram of their mouth showing which teeth are which.



Human Palate, with teeth of upper jaw. — *m*, molars; *pm*, premolars or bicuspids; *c*, canine; *i*, incisors.

6. Conclusion (and lead-in to next Activity) – When students have figured out what kinds of teeth they have, see if they can use that information to make an hypothesis as to what humans would eat and which teeth might be used for which foods.

How Many Teeth Do You Have?

Predict how many teeth you have: _____ teeth

****

Work with a partner.

How many teeth do you have in your lower jaw? _____

How many teeth do you have in your upper jaw? _____

Add those two numbers together. How many teeth do you have all together? _____

****

Listen carefully in class.

How many students have 20 teeth? _____

How many students have 19 teeth? _____

How many students have 18 teeth? _____

How many students have 17 teeth? _____

How many students have 16 teeth? _____

How many students have 15 teeth? _____

Use the following page to make a graph of this information.

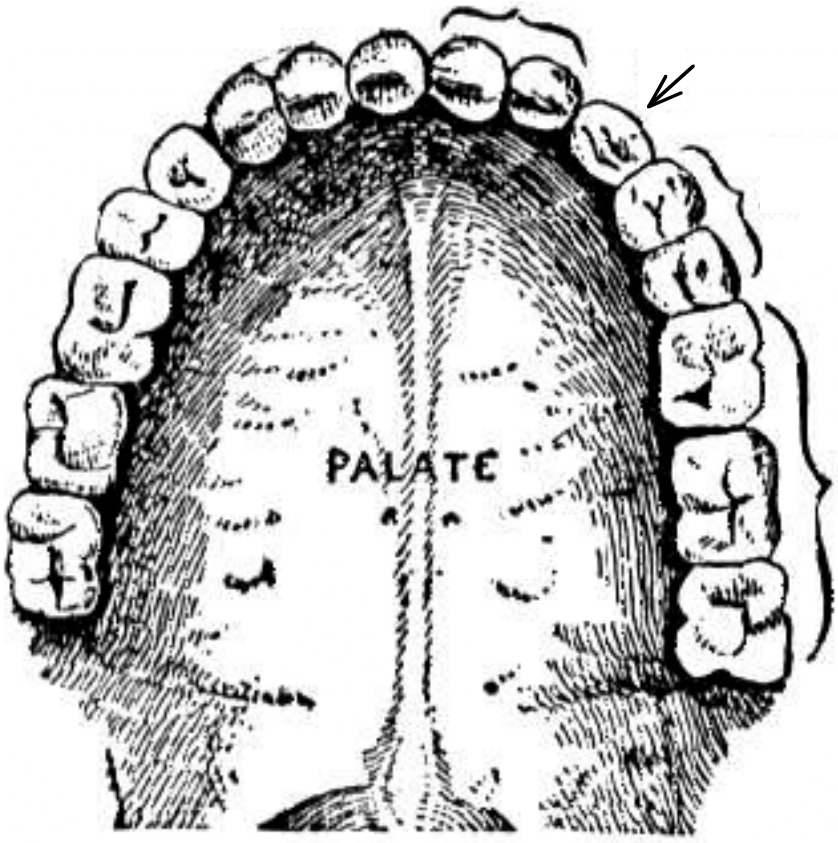
Name_____

Title of Graph _____

12						
11						
10						
9						
8						
7						
6						
5						
4						
3						
2						
1						
	Have 20 teeth	Have 19 teeth	Have 18 teeth	Have 17 teeth	Have 16 teeth	Have 15 teeth

Number of Students

Number of teeth


PALATE

Activity Three: What Teeth Do You Use?

Purpose

Students will predict and investigate which kinds of teeth are used to eat different kinds of food.

Materials

- Food: bread, carrots, nuts, chocolate chip cookies, raisins, apples (enough for each student to try each food)
- Mirrors

Procedure

1. Students will review information from Activity Two about what kinds of teeth they have.
2. Have students predict which teeth they would use to eat bread, carrots and nuts. Have them give a reason why they chose a particular kind of teeth.
3. Then have students try eating each kind of food and figure out which teeth are being used. Are the same teeth used at the beginning, in the middle, or at the end of chewing? Having mirrors and a partner may help.
4. Record what food they ate and what teeth are used to begin/continue/finish breaking down the food into smaller pieces.
5. Have students describe what each of kind of tooth is used for:

   canines – tearing and stabbing

   incisors – cutting

   molars – grinding and crushing
6. Have students predict what different kinds of teeth are used for the different kinds of food (cookie, raisins, apples).

Optional extension or homework: If students have a dog or cat, have them observe it eating. Try to describe what kind of teeth it has and its teeth and jaw movement.

Activity Three: What Teeth Do You Use?

Student worksheet Name_____

What three kinds of teeth do you have?

****

Predictions

What teeth would you use to eat bread?

Why?

What teeth would you use to eat carrots?

Why?

What teeth would you use to eat nuts?

Why?

****

Now try eating the bread. Which teeth are used?

Are other teeth used as you continue or finish eating?

Now try eating the carrots. Which teeth are used?

Are other teeth used as you continue or finish eating?

Now try eating the nuts. Which teeth are used?

Are other teeth used as you continue or finish eating?

Think about what teeth were used to eat the different kinds of food. Don't just tell what kind of food. Tell what kind of action your teeth are taking.

What are canines used for?

What are incisors used for?

What are molars used for?

Use the information you have learned to make predictions about what teeth will be used to eat other foods.

What teeth would be used to eat a chocolate chip cookie? Why?

What teeth would be used to eat raisins? Why?

What teeth would be used to eat an apple? Why?

****

Now try the chocolate chip cookie. What teeth were used?

Were you correct?

Why or why not?

Now try the raisins. What teeth were used?

Were you correct?

Why or why not?

Now try the apple. What teeth were used?

Were you correct?

Why or why not?

Activity Four: What Did It Eat for Dinner?

Purpose

Students will determine if a given jaw (or part of a jaw) is from a carnivore, herbivore or omnivore.

Procedure

1. Jaws should be labeled by letter. Make sure students have one worksheet for each jaw.

2. Students are divided into groups of about four.

3. Each group is given a jaw. They should study it and try to identify common characteristics. Then they should state the dentition (types of teeth – incisors, molars, canines). Next each group should record whether the animal is a carnivore, herbivore or omnivore and give their reasons for their choice.

4. After each group has made a decision, they pass their jaw to the next group.

5. After all groups have examined the jaws, have a class discussion saying which jaws were which and the reasons why.

Activity Four: What Did It Eat for Dinner?

Student worksheet Name _____

Which jaw are you studying? _____

Study it carefully. Describe it below giving as many details as possible.

_____

_____

_____

_____

How long is it in cm? _____

How big is the largest tooth? _____

How big is the smallest tooth? _____

How many teeth are molars? _____

How do you know?

_____

_____

_____

_____

How many teeth are canines? _____

How do you know?

_____

_____

_____

How many teeth are incisors? _____

How do you know?

_____

_____

_____

What does an herbivore eat? _____

What does a carnivore eat? _____

What does an omnivore eat?_____

Do you think this jaw came from a herbivore, carnivore or omnivore?

_____

Why? Give as many reasons as you can.

_____

_____

_____

_____

Interdisciplinary Extensions

Mathematics

- Graph number of teeth of students in class. Have each student count how many teeth he/she has (with help from a partner or high school student). Count how many students have 20, 19, 18, 17, 16 and so on. Graph number of teeth versus number of students having that many teeth.

- Compare size of teeth and /or number of teeth from different animals. Make a graph or chart. For example, a whale shark has 7200 teeth, each one-eighth inch big. The tusk from an old walrus can be 40 inches long. A dolphin has 80-104 teeth. An old elephant can have a ten-foot tusk that weighs 125 pounds

Social Studies

- Investigate the history of the toothbrush, toothpaste, wooden teeth, toothpicks and other ways of dealing with teeth in the past.

Integrated Language Arts

- Investigate teeth folklore and legends.

  Before students investigate teeth traditions around the world, have them try to think of some other ways to get rid of teeth that have fallen out.

  Read books about teeth traditions around the world. Have each student pick a tradition from a different country to tell about and find the country on a map.

  An excellent book is *Throw Your Tooth on the Roof: Tooth Traditions from Around the World* by Selby B. Beeler. Another book is *Tooth Tales: From Around the World* by Marlene Targ Brill.

- Write creative stories about a lost tooth or the tooth fairy.

  Read *How Rabbit Tricked Otter and Other Cherokee Animal Stories* which includes a "why" or pourquoi story about why deer teeth are blunt. Have students write their own "why" stories about teeth.

- Read trade books about teeth. (Others are listed in the CIBT kit contents.)

  A Quarter from the Tooth Fairy (Hello Math Reader Level 3)
  A boy tries to spend his quarter but gets confused about the many different coins that equal twenty-five cents.

  The Tooth Fairy (My First Reader) by Kirsten Hall
  Very easy.

Arthur's Loose Tooth by Lillian Hoban

What Do Fairies Do With All Those Teeth? by Michael Luppens
Lots of fun possibilities

Young Cam Jansen and the Lost Tooth by David Adler
Cam uses her photographic memory to help a classmate find a lost tooth.

The Tooth Book by Dr. Seuss
Rhyming test and illustrations point out what animals have teeth, their uses and how to care for them.