The Skeletal System

Summary

After a health education lesson review of the human skeletal system, a five day science experiment with chicken bones, in which the students observe physical changes or chemical reactions, reinforces the importance of the role that good nutrition has in body development.

Main Core Tie

Health Education - 5th Grade

Strand 5: NUTRITION (N)

Time Frame

2 class periods of 30 minutes each

Group Size

Small Groups

Life Skills

Thinking & Reasoning, Communication, Social & Civic Responsibility, Employability

Materials

- two chicken leg bones for each group
- two jars with lids for each group
- paper towels
- vinegar
- water
- rubber gloves (to be used when handling the chicken bones in order to avoid bacterial contamination)
- goggles (suggested in order to avoid problems with accidental splashing to the eyes)
- model or poster of a human skeleton
- individual science journals

Background for Teachers

The skeletal system, referred to as the skeleton, is made of bones that support and protect the body and the organs within the body.
Matter is anything that has mass and takes up space. Physical change of matter occurs in its size, state, or shape. Chemical change of matter occurs when the materials are changed into new substances.

Student Prior Knowledge

Prior experience with keeping a Science journal, working in groups, and collaboration rules.

Instructional Procedures

DAY ONE
STEP ONE: SKELETAL SYSTEM REVIEW
Use a model of a skeleton or poster while reviewing the human skeletal system. A skeletal system, called the skeleton, consists of the bones that support and protect the body and organs within it.

There are 206 bones within the skeletal system. Ask the students which bones they can name from the human skeletal system.

STEP TWO: THE ROLE OF NUTRITION IN BODY DEVELOPMENT

There are three things that help keep bones healthy: proper exercise, nutrition, and rest. Review the Dietary Guidelines for Americans (page 17 of 44) with the students. Determine which minerals and vitamins would be best for bone development. Ask the students to speculate about what would happen to bones if they did not receive the proper nutrition.

STEP THREE: BONE MATTER AND CHANGE

Divide the class into small groups of four. The following assignments are given to the members in each group: reporter, recorder, materials chair, leader. The reporter will share the findings of the group on the final lesson. The recorder will take notes about the experiment for the group for their science journals. The materials chair will gather the necessary supplies. The leader will take charge of the group.

The materials chair will obtain two jars with lids, two cleaned off chicken bone legs, approximately one cup of vinegar or enough to cover one bone inside a jar, one pair of rubber gloves, and a set of goggles.

The groups then make observations about the bones. These observations are noted by the recorder. Washing bare hands thoroughly after exposure to chicken bones is suggested.

The person in the group with the gloves and goggles will place one bone in a jar and cover it with water. The jar is labeled 'water'. The other bone is placed in the remaining jar and covered with vinegar. Label this jar 'vinegar'. The jars are placed in a secure area for five days. Each group will make predictions of the changes in bone matter, if any, they anticipate. These predictions are recorded in their Science journals.

DAY TWO (Five days later)

STEP ONE: OBSERVATION

One at a time the bones are removed from the jars, blotted with a paper towel, then observations are made about each bone. These observation are recorded. Ask the students to observe the pliability of the bones. Ask the student to discuss physical changes and chemical reactions of matter at this time.

STEP TWO: DISCUSSION

Explain to the students that the vinegar actually removed minerals from the bone. Ask the students to note that the bone in the jar of vinegar went through a chemical change, as the bone matter was changed from one substance to another. The bone in the water remained the same.

At this point the instructor can carefully break a bone that had been in water. Ask the students to discuss the type of change the bone has gone through (the change is physical since the bone matter is the same, only in different pieces.)

STEP THREE: CONCLUSION

Have the students record the conclusions in their science journals. The reporters share their findings with the class.

Strategies for Diverse Learners

The small group setting with different responsibilities is ideal for diverse learners. If needed, students can draw, rather than write, in their science journals. Those of higher ability can interpret the results with greater preciseness in vocabulary.

Extensions

Using measurements can help the students describe relationships between objects. Have the students make graphs, charts, and diagrams of the experiment. (Science; Mathematics)

Students can write about their findings using the 6+1 Traits of Writing. (Language Arts)

Using the Dietary Guidelines for Americans, have students determine the appropriate daily amounts

of minerals and vitamins a fifth grader should consume:

Determine which foods would help to meet these requirements and record on a chart. Cut pictures of the appropriate foods out of magazines and paste them to a paper to demonstrate the daily allowances. (Health Education; Mathematics; Arts)

Assessment Plan

The science journal can be a great tool to assess the understanding of the concepts taught within this lesson.

Rubrics

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Bibliography

- https://health.gov/dietaryguidelines/
- https://www.innerbody.com/image/skelfov.html
- https://www.bartleby.com/107/17.html

Authors

Val Murdock
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