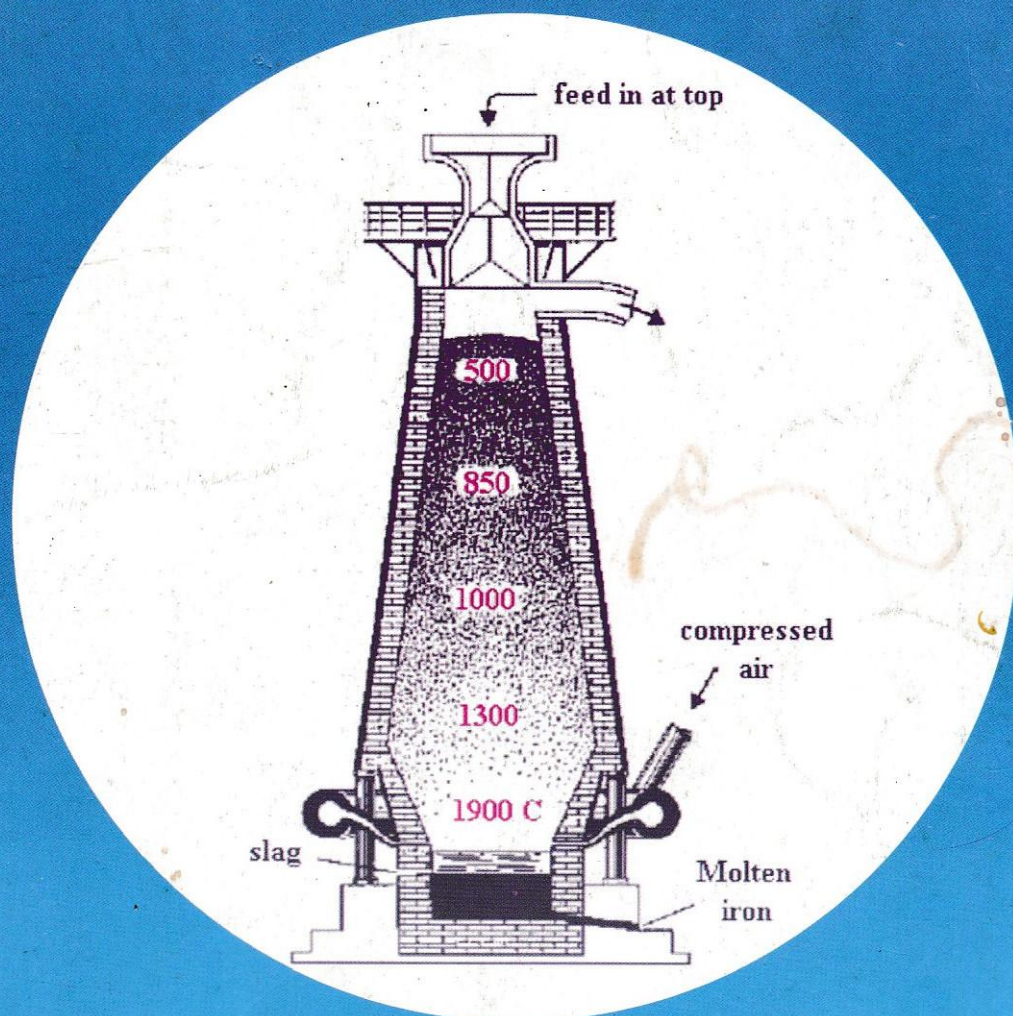


SCIENCE TEACHERS  
ASSOCIATION OF NIGERIA

CHEMISTRY PANEL SERIES 11

# METALS AND THEIR COMPOUNDS



A HANDBOOK FOR  
CHEMISTRY TEACHERS



## PAPER 8

### Effective Teaching of Sodium Metal (Alkali Metal) using Concept Mapping Method

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The essence of teaching is for learning to take place. A teacher who brings in confidence, enthusiasm, genuine interest and dynamic motivational skills into the classroom will propel students to take active responsibility for their learning. The teacher guide students in practice, giving necessary aid until the students are able to perform given tasks all by themselves. While a teacher is with the students he tries to understand how they think, how they solve problems and how they can be encouraged to develop life skills within and beyond the classroom environment. These targets are accomplished with different teaching method/strategies. Employing an effective teaching method enables a teacher to help students become active participants in any learning environment. Effectiveness of a teacher and students learning can be enhanced through appropriate strategy/method adopted in a learning situation.

An effective teaching method that could equip learners' knowledge on different concepts in chemistry is the concept mapping method. The principle of a concept map is that it provides a means of showing connection and relationships between a hierarchy of ideas ranging from the concrete to the abstract (Ajaja, 2009). Concept maps are graphical tools for organizing and representing knowledge needed to answer focused questions. Concept maps are diagrammatically represented with nodes or cells that contain a concept, question or item and links. The labeled links usually represented with lines or arrows describes the direction of the relationship. It tells the conceptual events taking place in a content process. Concept maps are very effective because it allow students represent their own understanding of domain-knowledge in a well organized format. It facilitates students' connection with newly acquired concepts. Asan (2007) describe concept maps as 'semantic networks' used to visualize the structure of knowledge. Tergun, kellers, Burkhard (2006) posits that concept mapping visualize information to foster cognitive processing of retrieving knowledge. Concept maps come in handy as visual symbols that are quickly and easily recognized. This help reduce large amounts of memorization by rote, by making use of links and connections logos, maps, arrows, road signs and icons that teachers and students can recall with little effort. Visual representation using concept maps allows for the development of a holistic understanding that words alone cannot convey. Concept maps enable students see patterns and connections that help them form mental pictures/structure that will help them handle new knowledge and relate same to past or existing knowledge. This deepens students' understanding, and helps to simplify complex ideas without trivializing or losing details. Concept map will enable the teacher achieve lesson objectives; in this case, Alkali metals using examples of sodium compounds.

#### Sample Lesson Plan on Connecting Ideas/Links to Concept Maps

##### Instructional Objectives

By the end of the lesson, students should be able to:

describe concept maps;

identify source of sodium and sodium compounds;

enumerate the uses of sodium compounds;

explain physical and chemical properties of sodium compounds using concept maps;

describe reactions appropriate to each sodium compounds using links and connections of concept maps.

##### Required Materials and Resources Displayed

Common salt, baking soda (powder), washing soda indigo dye, food/fruit drinks, preservatives,

bleach, glass, viscose rayon, soap, detergents, dye, food essence water softeners

Prior Knowledge of Students

Engage students to identify familiar substances exhibited;

They write down the various substances exhibited and where/how they are obtained;

Describe the basis for differences in the Alkali metal;

Explain what the substances are used for in every day-to-day activity.

### **Lesson Presentation**

#### **Step 1: Discovery:**

**Teacher Activities:** Guide students to discover and note how substances displayed could be used and for what purpose;

Facilitate students' knowledge to conceptualize concept map by using this as an illustration/example.

**Student Activities:** Pick up each material and examine to note what meaning to make out of them.

#### **Step 2: Inquiring to make links and connection to concept:**

**Teacher Activities:** Guide and facilitate students to identify and make links and connections to identified sources.

**Student Activities:** Making inquiry of each material/substance to identify sources/features to make links and connections to concepts and relate to every day activities they use each material for.

#### **Step 3: Investigation of activities to make connections/ links on different sodium compounds:**

**Teacher Activities:** Guide the students as they do the following:

Identify each sodium compounds, record their observations and try to make illustrations of different compounds of sodium using concept maps.

**Student Activities:** Identify substances to connect and link appropriately;

Try to make connections with real life observations/situations;

Go through journals, books and materials for references on how links connect to concepts.

#### **Step 4: Applying to real life situations (practice activities):**

**Teacher Activities:** Facilitate learners activities to name and identify different sodium compounds;

Guide them to give examples of each sodium compound, their state, constituents and use(s);

Guide them to mention characteristics, properties, preparation and reactions of each sodium compound.

**Student Activities:** Write down differences of each sodium compound;

Give examples, state characteristics of each sodium compound and its sources/constituents;

Propose ways to link and connect to familiar concepts;

Link and connect to properties and reactions applicable to each sodium compound.

#### **Step 5: Evaluation:**

Evaluate learners' activities as they make attempts to connect/link ideas to appropriate concepts that connects to each sodium compound.

Observe learners' efforts and ask probing questions that leads to appropriate link ideas and understanding;

Students explain why they make connections/links to desired concepts;

Students attempt more questions from the teacher for assimilation of ideas given/expected.

#### **Step 6: Quality assessment on concept map learning/ understanding:**

Students are encouraged to revisit their different diagrams/illustrations on connections and links made as display of a concept map.

They try to make sense of the connections/links they have made for further discussion;

They refer to concept maps already presented to make sense out of their own ideas;

They go through the entire work to correct possible mistakes and try to make proper appraisal/assessment of their efforts/attempt.

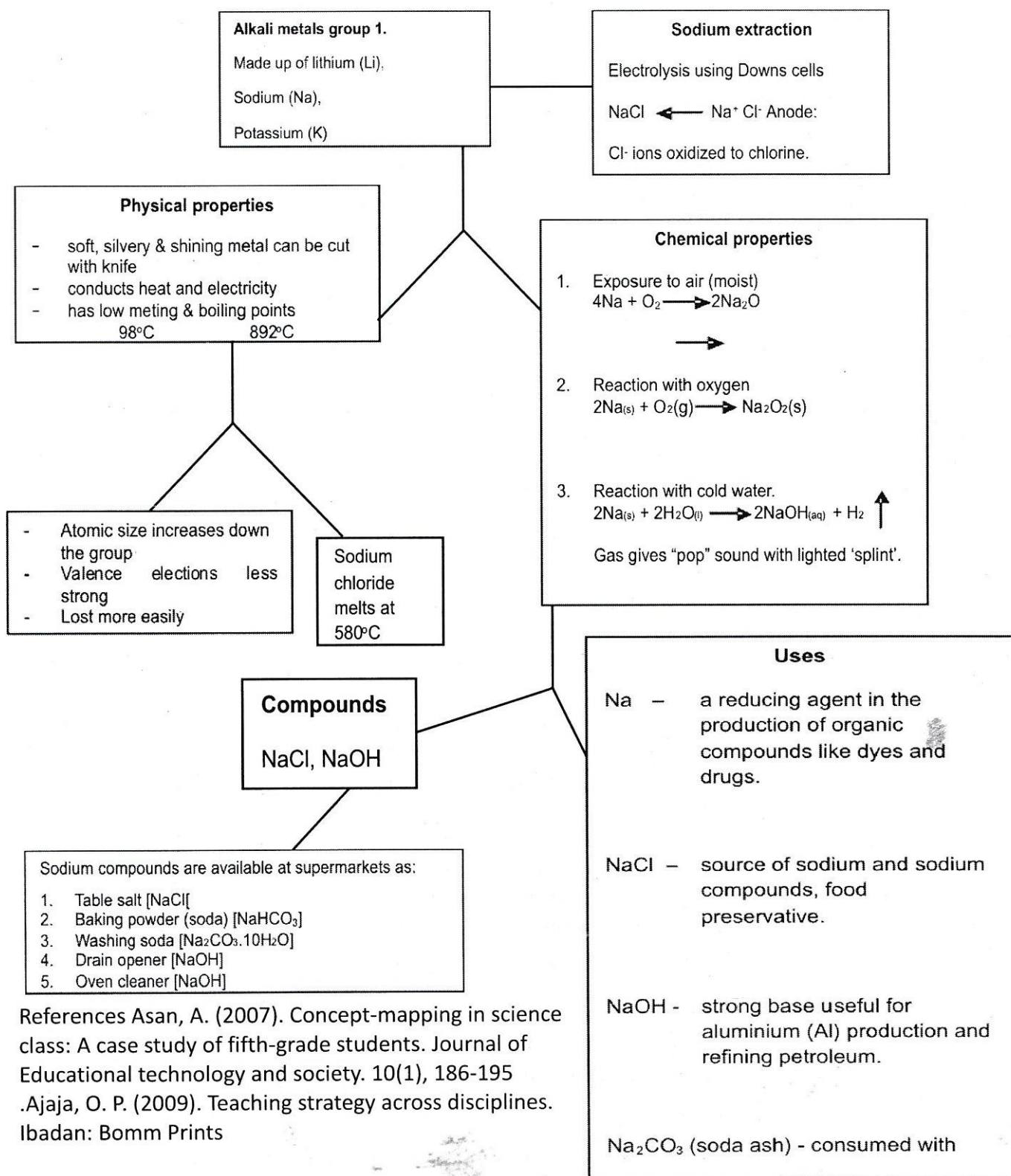
#### **Conclusion:**

Concept maps enable the ease of transfer of ideas and retention of facts without losing details.



Students take home assignments to practice the use of concept maps for knowledge internalization of alkali metals concept.

## Concept Mapping Strategy for Teaching Sodium Metal



References Asan, A. (2007). Concept-mapping in science class: A case study of fifth-grade students. *Journal of Educational technology and society*. 10(1), 186-195  
 .Ajaja, O. P. (2009). *Teaching strategy across disciplines*. Ibadan: Bomm Prints