Mystery Elements

Background
In this activity, you are a detective trying to figure out the identity of the Mystery Elements. You will use the clues given on the Mystery Element cards, construct Bohr models of the elements, and fill out the missing information in the data table.

Pre-lab Questions
1. Vocabulary – Define the words below to beginning the activity:
   a) Atom
   b) Subatomic particle
   c) Proton
   d) Neutron
   e) Electron
   f) Valence electron
   g) Nucleus
   h) Electron cloud
   i) Orbital Shell
   j) Bohr model
   k) Atomic Number
   l) Atomic Mass
   m) Period
   n) Group

2. Answer the following questions:
   a) What is the structure of an atom?

   b) Describe the locations and charges of the subatomic particles.

   c) What determines the element’s identity?
d) How is the atomic mass calculated?

e) What do groups and periods on a periodic table indicate about the atom?

**Objective**
Using clues to create a Bohr model of an element, determine the element’s identity, # of protons, # of neutrons, # of electrons, # of valence electrons, atomic number, atomic mass, as well as the period and group where the element is located.

**Procedure**
1. Choose a “Mystery” Element card.
2. Use the Periodic Table to determine the identity of the element.
3. Create a Bohr model of the element using the pan and beads.
4. Complete the data section for the mystery element.
5. Complete steps 1-4 for each of the 5 “Mystery” elements.
6. Choose a new element (atomic number 1 – 18) and create a “Mystery” Element card by writing down clues on the index card.
7. Trade your index card with your partner.
8. Complete steps 2-4 for the new “Mystery” elements.
9. Answer the analysis questions.

**Data**

<table>
<thead>
<tr>
<th># of Protons</th>
<th># of Electrons</th>
<th># of Neutrons</th>
<th>Atomic Number</th>
<th>Atomic Mass</th>
<th># of Valence Electrons</th>
<th>Element Name</th>
<th>Period</th>
<th>Group</th>
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<tbody>
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Analysis
1. What subatomic particle identifies the element?

2. How do you know which group the element is in?

3. How do you know which period the element is in?

4. How can you calculate the atomic mass?

Conclusion
For your closing task, write a 3-5 sentence summary about the structure of an atom, the location and charges of the subatomic particles, and what determines the identity of the element.