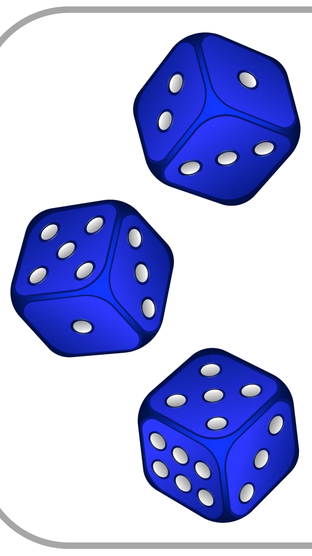
Game Theory: Using Educational Games to Motivate 7th to 10th Grade Students in their Study of Science*

International Teacher Education Conference – 16th to 18th August 2017 – Harvard University, Cambridge, Massachusetts, USA

1 Rational for Educational Games

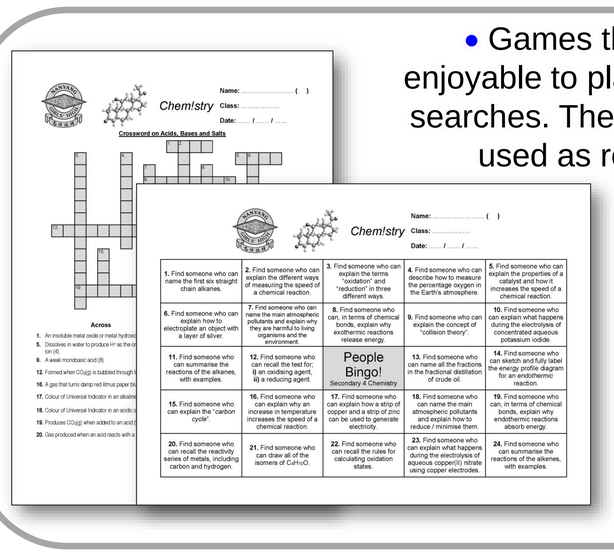


- Educational games are a serious way of engaging students – encouraging them to cooperate and motivating them to learn.
- Optimum learning is achieved when a high level of challenge is coupled with a low level of stress.
- In essence, an educational game is created when the teacher takes content that would normally be presented to the students on a worksheet and repackages it as recreational activity.
- Educational games encourage cooperation and equal participation amongst students. They can also encourage empathy, honesty and integrity.

2 Designing Educational Games

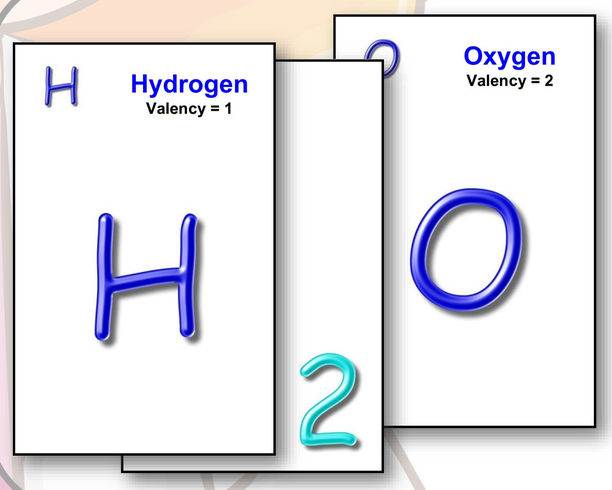
- Games should be designed that have simple and easy-to-follow rules. Ideally, the game should be modelled on one that students are already familiar with – time should be spent playing the game and not learning the rules!
- Using colour adds to the visual impact of the game. Printing on card and laminating makes the games more durable.
- Educational games can be designed with a varying level of difficulty for the students, thus allowing for some degree of differentiation.

3 Simple Games

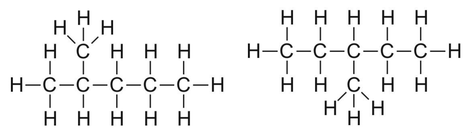


- Games that are simple to create and enjoyable to play include crosswords and word searches. These may be given as pre-tests or used as revision at the end of a unit.
- People bingo requires students to cooperate as they find classmates who can answer the individual questions printed on their bingo boards.
- Pictionary requires students to deduce a word or term based upon their peer's drawing.

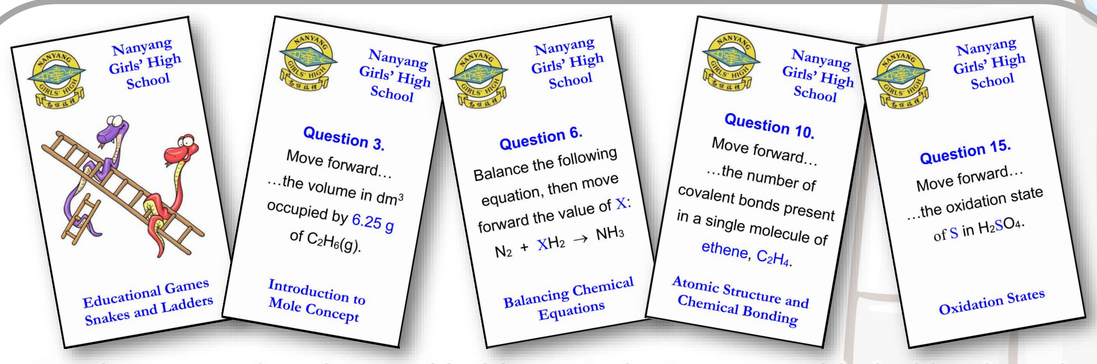
4 Card Games



- Number playing cards. This helps to identify questions that students have a difficulty answering and also helps to identify any cards that are lost!
- Ideas for card games; making chemical formulae (shown on the left), isomer snap (organic chemistry) and Quiz-Quiz-Trade.

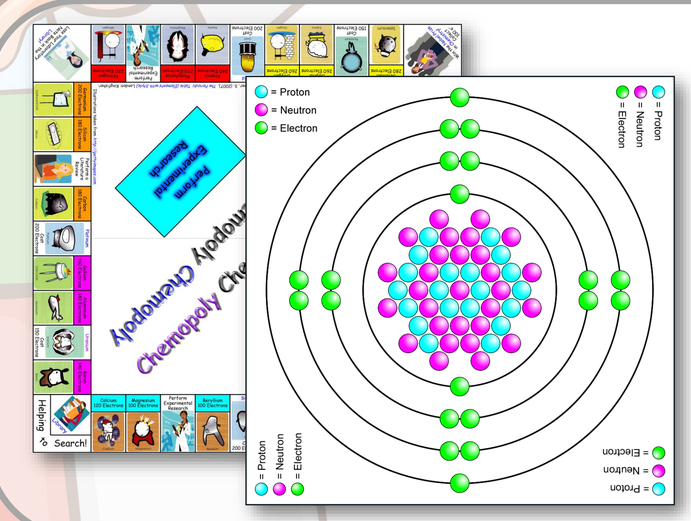


5 Snakes and Ladders



- For the game of snakes and ladders, students are provided with a board, counters, but no dice. The dice are replace by questions printed on cards.
- Each question has a numerical answer. Students take turns to answer their questions, then move the corresponding number of spaces on the board.

6 Miscellaneous Games

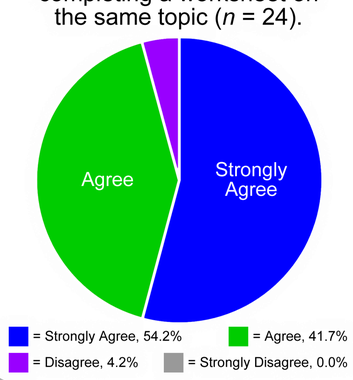


- For Periodic Table Monopoly®, students move around the board answering questions and buying elements of the same Group.
- For the atom building game, students place counters – representing protons, neutrons and electrons – on a large diagram of an atom. Students score points for stable nuclei, charged ions and neutral atoms.

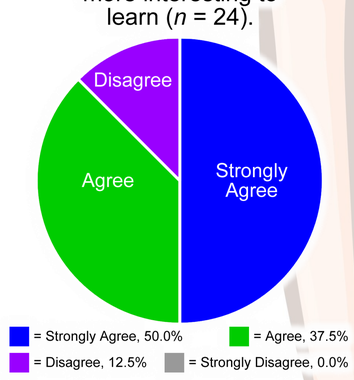
7 Reflections and Conclusions

- Students' answers to a survey show that educational games are enjoyable, interesting and motivating activities that encourage cooperation.

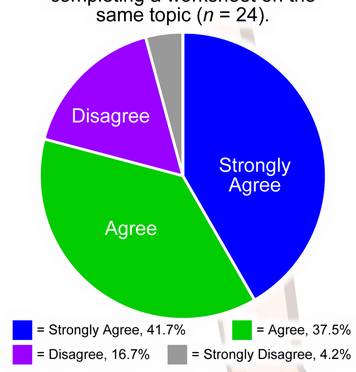
1. Playing educational games was more enjoyable than completing a worksheet on the same topic (n = 24).



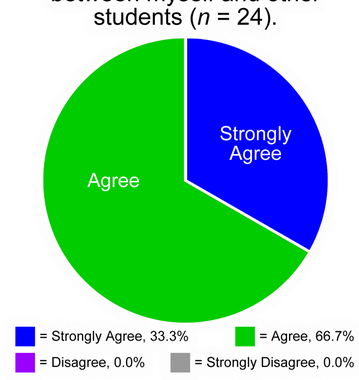
2. Playing an educational game makes the topic more interesting to learn (n = 24).



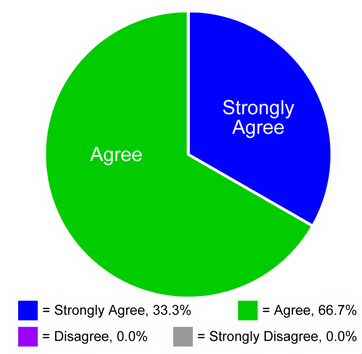
3. I was more motivated to learn while playing the educational game than I would have been while completing a worksheet on the same topic (n = 24).



4. Playing educational games encourages cooperation between myself and other students (n = 24).



5. I would like to play more educational games in the future (n = 24).



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