FLIPPED CLASSROOM ACTIVITY

For Advanced Organic Chemistry-I

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Out-of-class Activity Design -1

Learning Objective(s) of Out-of-Class Activity

After watching video students will be able to understand & draw following elements using **G Chem Paint** Software

- Structures of organic intermediates like carbocations and free radicals
- Shifting of an electron and electron pair
- Reaction pathway (Using appropriate reaction arrow and curve arrows)
- Resonance structures

Key Concept(s) to be covered

- Generation of organic intermediates
- Bonded & non-bonded electron movement
- Understanding the resonance and retrosynthetic pathway

About Out-of-Class Segment

- Meant mainly for Information-Transmission to student.
- Mostly help achieve lower-order cognitive levels (Recall-Understand-Apply)
- Teacher takes time to search and locate videos.
- Out-of-Class activity should not be too lengthy,
  (ideally think of 1 lecture being transferred outside)

Main Video Source URL: https://youtu.be/97Ds5mV1wyI

License of Video: CC-BY-SA (reuse allowed)

Mapping Concept to Video Source

CONCEPT	VIDEO SEGMENT	DURATION (in min)
Formation of Carbocations & free radicals	Seg 1- 0:00 - 3:12	3:12
	Seg 2- 3:13- 5:09	1:96
Reaction pathway & resonance	Seg 3- 5:10-5:56	0:46
	Seg 4- 5:57- 6:47	0:90
Retrosynthetic pathway, Summary & Assignment	Seg 5- 6:48- 8:29	1:81

TOTAL DURATION - 9: 27 min

Aligning Assessment with Learning Objective

Learning Objective	Assessment Strategy	Expected duration (in min)	Additional Instructions (if any)
Drawing structures of organic intermediates and understanding shifting of electrons (**Note:** By attempting Q1 & 2 students will be able to know homo & hetero bond fission to form free radicals & carbocations)	Q1. Draw intermediates of **a** & **b** by G Chem Paint using correct arrows a) b) Q2. Why carbon get positive charge after bond fission with halogen?	15 Min	**Note:** Que. No 1 & 6 is for **2 marks** each. Que no. 2 to 5 holds **1 mark** each. **Total marks : 8** (* 50% of obtained marks will be credited to internal assessment. For e.g. if you get 6 mark, then 3M will be credited) •For Q1 & Q2: Watch Seg 1 – 2 & Pause

Learning Objective	Assessment Strategy	Expected duration (in min)	Additional Instructions (if any)
Reaction pathway (Using appropriate reaction arrow and curve arrows) & Resonance structure (**Note:** By attempting Q3 to Q6 students will be able to understand reaction path, resonance and retrosynthesis)	Q3. How reaction path is created in G Chem Paint Q4. Draw resonance structures of acetate ion Q5. What is retrosynthetic pathway ? Q6: Solve Q1 & Q2 of assignment section of the video	20 Min	•For Q3: Watch Seg 3 & Pause •For Q4: Watch Seg 4 & Pause •For Q5: Watch Seg 5 & Pause •For Q6: Watch Seg 5 & Pause **[**Imp Note: Submit answers 24 hrs before lecture**]**

In-class Activity Design -1

Learning Objective(s) of In - Class Activity

After completion of activity students should be proficient in the following

- Determining organic intermediate formation
- Application of the concept in drawing related reaction mechanisms

Key Concept(s) to be covered

- Homolytic & heterolytic bond fission
- Electronegativity and electron movement
- Reaction conditions and mechanisms

In-class Activity Design -2

Active Learning activity planned

Think-Pair-Share

Explain the strategy by giving details of

What Teacher will do? (Think phase: 6 min.)
After initial discussion on the concept covered in the Out-of-class activity, teacher will pose the following question

Q1: Draw two reactions of Alkyl halide with appropriate conditions which will proceed via carbocation and free radical formation

What Students will do?
Students will think individually and draw the concerned reactions

What Teacher will do? (Pair phase: 15 min.)

After 6 min. teacher will ask students to form pairs and discuss the reactions and identify the correct reactions.

Now students will be ask to draw complete mechanisms of those reactions by using appropriate arrows and showing electron movement.

What Student will do?

In pairs students will identify the correct reactions and will draw their mechanism

What Teacher will do? (Share phase: 15 min.)

Teacher will ask pairs to share their reaction and mechanism so that correct reactions and mechanism can be identified and after students sharing teacher will discuss the concept and will try eliminate any misconceptions.

why TPS is an active learning strategy ? Justify

Think Phase: Allows students to think and draw individually upon the concept they had learn in out-of –class activity

Pair Phase: Stimulates discussion and analysis to identify correct reaction and extend cognitive level by discussing and drawing mechanism

Share phase: Stimulates larger discussion and helps to eliminate misconceptions regarding the topic if any and students also get feedback.

Therefore TPS is an active learning strategy

Flipped Classroom Activity with Peer Instruction Strategy

Harun M. Patel

Diabetes Mellitus and its type

Pharmacology

Pharmacy

2nd Year Undergraduate Students

North Maharashtra University Jalgaon

Dept. of Pharmaceutical Chemistry

R.C. Patel Institute of Pharmaceutical Education & Research Shirpur (M.S.) India.

Out-of-class Activity Design -1

Learning Objective(s) of Out-of-Class Activity:

At the end of watching the videos student should be able to,

1. Definition of Diabetes (Understand Level)
2. Types of Diabetes (Understand Level)
3. Risk Factors(Understand Level)
4. How to avoid Diabetes (Apply Level)

Key Concept(s) to be covered:

1. Diabetes Mellitus
2. IDDM and NIDDM Diabetes
3. Risk Factor and Symptoms

Out-of-class Activity Design - 2

Uploaded Video URL	https://www.youtube.com/watch?v=2jTLBWhSGmw
License of Video	CC-BY-SA
Duration of Screencast	7.26

Out-of-class Activity Design - 3

Aligning Assessment with Learning Objective

Learning Objective	Assessment Strategy	Expected duration (in min)	Additional Instructions (if any)
Q1:Definition of Diabetes (Understand Level)	Q.1 What is Diabetes a) Metabolic disease b) Deficiency of Insulin c) Both a and b d) None of the above	10 Min	Watch V1 and then answer Q1
Q2:Types of Diabetes (Understand Level)	Q 2. Which of the following diabetes needs insulin a) Type-I b) Type-II c) Both a and b d) None of the above Q 3. Which diabetes is not insulin dependant a) Type-I b) Type-II c) Both a and b d) None of the above	10 Min	Watch V1 and then answer Q2

Out-of-class Activity Design - 3

Aligning Assessment with Learning Objective

Learning Objective	Assessment Strategy	Expected duration (in min)	Additional Instructions (if any)
Q3: Risk Factors	Q4. Which is risk factors for Type-I diabetes a) Auto-immune disease b) Overweight c) Blood pressure d) High Lipid	10 Min	Watch V1 and then answer Q3
Q4. How to avoid Diabetes	Q5. Which are factors responsible for Type-2 DM a) Overweight b) Age c) Genetics d) All of the above	10 Min	Watch V1 and then answer Q4

Expected activity duration 40 Minitues

In-class Activity Design -1

Learning Objective(s) of In-Class Activity:

At the end of the class, students will be able to…

1) What is dibetes
2) What are the types of diabetes
3) What are the symptoms and risk factors
4) How we can avoid diabetes

Key Concept(s) to be covered:

1. Diabetes and its types
2. Symptoms and risk factors

In-class Activity Design -2

Active Learning activity(ies) that you plan to do

1. Think Pair and Share to understand the Diabetes

Explain the strategy by giving details of:

1. What Teacher will do? Teacher will involved in discussion with students about Diabetes
2. What Students will do? Students will discuss about Diabetes, Symptoms and risk factors

Justify why the above is an active learning strategy

They are required to think deeply about the content they were familiarized in out-of-class and do higher order thinking.
There is also feedback provided (either through peer discussion or instructor summary)

In-class Activity Design -2

Active Learning activity(ies) that you plan to do

Real world problem solving using

1. Think-Pair-Share

Concept clarification using

1. Peer Instruction

In-class Activity Design -2

Peer Instruction Strategy – What Teacher Does

Pose the two PI questions at the start of the class and provide summary of basic identities and expression simplification:

Q.1 What is Diabetes
a) Metabolic disease
b) Deficiency of Insulin
c) Both a and b
d) None of the above

Q 2. Which of the following diabetes needs insulin
a) Type-I b) Type-II
c) Both a and b d) None of the above
Q 3. Which diabetes is not insulin dependant
a) Type-I b) Type-II
c) Both a and b d) None of the above

In-class Activity Design -2

Peer Instruction Strategy – What Student Does

Then they will discuss with peers and come to consensus

In-class Activity Design -2

TPS Strategy – What Instructor does

Think (~2 minutes)
Instruction: Which is risk factors for Type-I diabetes whether Auto-immune disease, Overweight, Blood pressure or High Lipid

Think individually and identify the risk factors for Type-I diabetes

In-class Activity Design -2

TPS Strategy – What Instructor does

Pair (~5 minutes)
Instruction: Now pair up and compare your answers. Agree on one final answer.
While students are pairing and discussing, instructor goes to 2~3 sections to see what they are doing.

In-class Activity Design -2

TPS Strategy – What Instructor does

Share (~8 minutes)
Instructor asks a group to share their answer with class and see whether there are different answers. After sharing is done, instructor gives feedback on the correct solution and discuss the risk factors associated with Type-I diabetes

In-class Activity Design -2

Justify why the above is an active learning strategy

In both the above strategies, students are required to go beyond mere listening and execution of prescribed steps. They are required to think deeply about the content they were familiarized in out-of-class and do higher order thinking. There is also feedback provided (either through peer discussion or instructor summary)