

Name:

Mentor Teacher:

Classroom:

Subject Area/Grade Level of Lesson Plan:

Date:

**Redox Reactions relay**

Length of Lesson Plan

**Lesson Rationale/Overview: brief description of the lesson topic, activity, assessment (This is part of the knowledge package).**

The students will learn about oxidation reduction reactions by having discussions with fellow class members and playing a redox relay game with cards and physical movement. The scaffolds will include two worksheets and a structured game. To assess the students formatively, I will require them to self direct group discussions and complete a worksheet that can be turned in for a grade.

**Objectives (students will...):**

Provide definitions for vocabulary associated with redox reactions

Assign oxidation numbers to different elements and compounds

Understand the relationship between oxidation and reduction

Relate given elements and compounds to definitions of redox

Play a relay game to understand the interactions related to a transfer of energy

**Standards (TEKS or national standards addressed):**

(10) Science concepts. The student understands and can apply the factors that influence the behavior of solutions. The student is expected to:

(H) understand and differentiate among acid-base reactions, precipitation reactions, and oxidation-reduction reactions;

**Knowledge Package:** Add cheat sheet of content overview for your own reference, include misconceptions students may have and how you will address these.

See Appendix

**Assessment of Prior Knowledge: Add quick pre-assessment activity here (can be done as hook, or on day prior to lesson) 4 corners/KWL/think/pair/share / exit slip question...**

Since I am continuing a lesson from Dr. Rowe, the assessment of their prior knowledge will include how efficiently they fill out the worksheets. The worksheets are a continuation of worksheets they filled out the day before.

**Materials / resources / equipment needed:**

*Teacher:*

Oxidation reduction chart

Cheat sheet

Deck of cards

Post- it notes

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**Student:**

Scaffold 1: Redox reactions definitions worksheet

Scaffold 2: Redox reactions Examples worksheet

Scaffold 3: Redox relay materials

- Cards in envelopes
- Cards to put on the comparison chart
- Activity series chart
- REDOX reactions chart

**Daily Agenda: YOU WILL WRITE THIS ON THE TEACHERS BOARD (or have it as the first ppt slide)**

**(What I will write on the board so that the students' know what is going to happen during this lesson plan).**

**1. Objective and standard met:** understand redox reactions (10:H)

**2. What they should be able to do to show their understanding by the end of the lesson:**

Understand how the exchanging of electrons relates to a give and take relationship modeled in the redox relay game.

**3. Major activities for lesson:** Group worksheet, Divide and Discuss, Redox Relay

**4. Homework or next time...**Maybe....

**Activities:**

**(Includes warm-up/hook, details about what the teacher and student are doing, and a break down of the time interval for each activity).**

Activity	Time needed	What are you saying / doing / asking	What written directions are you handing out/ writing on the board?	What are the students saying / doing/asking?
<b>Hook/Invitation</b>	(1 min)	Reflection: Have the students explain what they did on Friday. You have one minute to discuss and come up with some things you learned on Friday. Organize into groups depending on suit of card. "Good morning class, today we will continue our discussion on redox reactions. Please organize yourselves based on the suit on your card. Hearts are over here, diamonds over here and spades over here. We have to get through this definitions worksheet to make sure you are all ready to play an awesome game. So please turn your attention to the Redox reactions worksheet."		
<b>Activity 1</b>	(5 – 8 min)	"Number 3 of hearts, will you read the sentence under definitions. You can fill in the blank yourself or call on someone else to fill it in for you." Student: "Oxidation-reduction or _____ reactions are reactions in which the oxidation numbers of elements change due to loss or gain of electrons." (Redox if she fills in the blank). "Number 8 of spades, will you come to the board? OIL stands for oxidation is loss of electrons." Student comes to the board and writes in the students perceptions of RIG. Please help the eight of spades fill in the RIG part of the		

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	worksheet.” “Does everyone agree that the acronym stands for (read board)?” [If they agree and it’s correct – “good job”.] [If they don’t agree and it’s correct – “why do you think it’s not correct?”.] [If they do agree and it’s incorrect – “Why do you think it’s correct?”.] etc.
Transition (1 - 3min)	“Great job! For the rest of the worksheet, you will work in your suits to fill out only one part of the worksheet. Hearts, consult with each other and fill out the oxidation section of the worksheet. You will be sharing to the class. The Spades, consult with each other and fill out the reduction section of the worksheet. You will be sharing to the class. The diamonds, consult with each other and fill out the reducing agent and oxidizing agent section of the worksheet. You will be sharing with the class. We can’t play the game until the worksheet is complete so please stay on task.”
Activity 2 (10 – 12 min)	The class holds group discussions to complete their designated section of the worksheet. We all come together again after about 8 minutes or until everyone is ready to share. To call on students to share with each other, I will draw a random card from the clubs pile and the corresponding number of each suit will answer the first definition in their section. The same procedure will be used to call on other sections.
Transition (3 min)	“Now we will assign what team you will be on for the redox relay! There will be five groups. Draw one of the slips of paper and go to the lab bench that has the same color that’s on your paper slip after we have gone through the directions together.” Pass out the rules of the game during this time
Activity 3 (20 – 25 min)	“We now get to play a redox relay! Please listen carefully so I don’t have to repeat myself too often. The goal of the game is to solve all six puzzles and put your winning cards in the right column of this chart – point to a parchment paper with a differences T-chart. First you need to assign one person to communicate with the mediator and one person to put the card on the chart. All the rest of your team will stay at the assigned lab bench at all times. (rephrase in a simpler way if possible). This is where the relay part comes in Got it? The communicator will come to the mediator (show myself walking hastily from the lab bench to the front of the room) and the mediator (standing here) will hand them an envelope with a card in it (act like the mediator). The card contains three or four compounds on it. Assign oxidation numbers to each compound or element in the boxes below them.” (put example on board) “once you fill that out, you bring it back to the mediator who checks if they’re right. If they’re right, he gives you another envelope with the same number on it. In that envelope is another card that you’ll have to fill out and bring to the moderator to check. The cards won’t take long to answer but you’re competing against each other so you have to be fast and work together. Also, you have two charts on your lab table that will help you solve the puzzles. If you complete both envelopes with the same number on it, you get a card with a clue on it. The clue tells you which side of the chart you put it under (demonstrate). Once all six cards are in place on the chart, you win!! I know it sounds like a lot but it will be very fast paced and organized, like a RELAY!”

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	The students play the game for about 20 minutes or until everyone has finished the relay.	
Summary	5 min	“Thank you for playing and having such great attitudes. Let’s debrief and reflect on the game. I want you to take this post-it note and answer a question for me about the game on your note. Think about redox reactions in terms of their definitions. What were the similarities between the interactions between the moderator and the communicator and the kinds of interactions that occur in redox reactions?”
Differentiation( How will I address the needs of other learners) Fill in some or all of the below table to show how you will meet the needs of all learners. Describe modifications or strategies of activities for each group.		
Special populations:		
By Learner Readiness	By Learner Interest	By Learning style
There will be a lot of group work to make sure ideas of all readiness levels are considered and reviewed.	Different activities such as worksheets, group discussion and play. Also, the students will get to chose their roles in the game depending on their interest.	Visual – Worksheets and examples on the board as well as cards in the game. Verbal – Lots of discussion opportunities and group interactions. Kinesthetic – redox relay! Physical movement in the game.
Assessment:		
<p><i>Formative:</i> I will assess what the students have learned during share time after group discussions. If there are misconceptions about the material, I will change my approach to a more informative, lecture – based class. The worksheet they fill out will provide a scaffold that can also be used for assessment.</p> <p><i>Summative:</i> The exit slip where the students reflect on the redox relay and the relationship between the mediator/communicator interactions and the interactions that happen in redox reactions.</p>		
Teacher Reflections:		
The type of thinking the students will be engaging is predicting the oxidation numbers of elements and compounds. The text will be the cards with the puzzles the students will solve. The microstrategy will be the game itself.		

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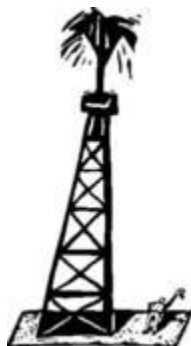
Date:

## Scaffold 1: Redox Reaction Definitions Worksheet

### Definitions

Oxidation-reduction or \_\_\_\_\_ reactions are reactions in which the oxidation numbers of elements change due to loss or gain of electrons.

*Would it be possible to have oxidation without reduction?*



O

R

I

I

L

G

#### Oxidation

- Definition:
  - In terms of electrons:
  - In terms of charge:
  - Refers to:

#### Reduction

- Definition:
  - In terms of electrons:
  - In terms of charge:
  - Refers to:

#### Reduction Agent

- Definition
  - Refers to:

#### Oxidizing Agent

- Definition
  - Refers to:

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**Scaffold : Redox Reactions Example Worksheet****ATTENTION: This worksheet will be used to play the Redox relay and is modified into cards**

To determine if a reaction is a REDOX reaction:

1. Assign oxidation numbers to each element in the reaction.
2. If any of the oxidation numbers change in the reaction then the reaction is REDOX.

Practice:

Reaction	REDOX? Yes/No	Element Oxidized	Element Reduced	Oxidizing Agent	Reducing Agent
$\text{Cu} + 2\text{AgNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + 2\text{Ag}$					
$\text{PbCl}_2 + \text{Li}_2\text{S} \rightarrow \text{PbS} + 2\text{LiCl}$					
$2\text{Fe} + 3\text{ZnS} \rightarrow \text{Fe}_2\text{S}_3 + 2\text{Zn}$					
$2\text{NH}_3 \rightarrow 3\text{H}_2 + \text{N}_2$					

Homework: Fill in the table/identify which equations are REDOX reactions.

Reaction	REDOX? Yes/No	Element Oxidized	Element Reduced	Oxidizing Agent	Reducing Agent
$\text{F}_2 + \text{K}_2\text{S} \rightarrow 2\text{KF} + \text{S}$					
$\text{ZnCl}_2 + \text{Li}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + 2\text{LiCl}$					
$2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$					

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Redox Reaction Relay

**Objective:** To solve all of the puzzles and earn red and blue card clues. Properly arrange the cards on your chart to win!

**Materials: Two sets of envelopes with puzzles.**

6 "A" cards are to be assigned oxidation numbers

6 "B" cards to be solved by identifying different agents in the equation.

3 Red - 3 Blue cards with clues about oxidation or reduction.

1 oxidation/reduction chart where the red and blue cards will be arranged

1 activity series chart to help the brain team

1 oxidation number chart to help the brain team

1 answer sheet for the mediator to check for correct completion of the puzzles

**Players and their location:**

Mediator (Dr. Rowe and myself): At the board: Gives the communicator the puzzle envelopes, checks the work of the brain team and rewards/corrects the work done. The mediator will only have the materials that the think tank has and will have to check the work based on charts. The communicator exchanges information with the mediator to move through the game.

Communicator (one person): Moves from the lab bench to the board: The communicator's job is to help solve the puzzles and take the puzzles from the brain team to the mediator. The communicator then either takes a new puzzle to the brain team or the same puzzle back for corrections.

Chart organizer (one person): moves from the lab bench to the oxidation/reduction chart: the organizer's job is to take the red and blue clue cards and properly arrange them on the chart. The organizer only moves from the lab bench to the chart.

Brain team (all other wonderful players): At the lab bench at all times: The brain team solves the puzzles that are brought to them by the communicator. This team can use the resources provided (activity series and oxidation number charts) to solve the puzzles. Once the puzzles are solved, they will be handed to the communicator who takes them to the mediator for evaluation. If the puzzle has not been solved correctly, the brain team will have to redo the puzzle.

**How to move through the game step by step:**

Step 1: Everyone go to their designated relay areas

Step 2: The communicator goes to the mediator and the mediator hands them an envelope with a number and a letter on it (such as 1A). In the envelope is a card with a puzzle on it.

Step 3: The communicator brings the first puzzle to the lab bench and helps the brain team solve it. IF the card has the letter A next to the number, the brain team simply has to assign overall oxidation numbers to the element or compound. The brain team does not need to separate the elements in a

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compound and assign individual numbers to the elements that make up the compound. They simply need to assign oxidation numbers to the compound as it is stated.

Step 4: When the brain team solves the puzzle, the communicator brings the card to the mediator who checks to see if the brain team solved the puzzle correctly. If correct, the mediator hands the team another envelope with the corresponding number on it (such as 1B). In the envelope is another card with a different kind of puzzle. The communicator takes this puzzle with a B on it to the lab bench to solve with the brain team.

Step 5: Once this puzzle is solved, the communicator takes it to the mediator to check for correct completion. If both A and B components of the same puzzle number are complete, the mediator hands the communicator a red or blue card.

Step 6: The communicator takes the blue/red card and hands it to the brain team. The brain team and the organizer determine where the card will go underneath the oxidation reduction comparison chart. The organizer then takes the card to the chart and places it under the correct side.

Repeat until all puzzles are solved and all cards are correctly placed.



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### SCRIPT

“Good morning class, today we will continue our discussion on redox reactions. We have to get through this definitions worksheet to make sure you are all ready to play an awesome game. So please turn your attention to the Redox reactions worksheet.”

Activity 1: Class directed learning      Scaffold 1: Redox Reactions definition worksheet

Time: (5 – 10 min)

“The three of hearts, will you read the sentence under definitions. You can fill in the blank yourself or call on someone else to fill it in for you.”

Student: “Oxidation-reduction or \_\_\_\_\_ reactions are reactions in which the oxidation numbers of elements change due to loss or gain of electrons.” (Redox if she fills in the blank).

“The eight of spades, will you come to the board? Alright class, OIL stands for oxidation is loss of electrons. Please help him/her fill in the RIG part of the worksheet.”

Student comes to the board and writes in the students perceptions of RIG.

“Does everyone agree that the acronym stands for (read board)?” [If they agree and it’s correct – “good job”.] [If they don’t agree and it’s correct – “why do you think it’s not correct?”.] [If they do agree and it’s incorrect – “Why do you think it’s correct?”] etc.

Activity 2: Group discussion      Scaffold 1: Redox Reactions worksheet (10 - 12 min).

“Great job! For the rest of the worksheet, you will work in your suits to fill out only one part of the worksheet. Hearts, consult with each other and fill out the oxidation section of the worksheet. You will be sharing to the class. The Spades, consult with each other and fill out the reduction section of the worksheet. You will be sharing to the class. The diamonds, consult with each other and fill out the reducing agent and oxidizing agent section of the worksheet. You will be sharing with the class. We can’t play the game until the worksheet is complete so please stay on task.”

To call on students to share with each other, I will draw a random card from the clubs pile and the corresponding number of each suit will answer the first definition in their section. The same procedure will be used to call on other sections.

Activity 3: REDOX practice game      Scaffold 2: Card game relay      Time: hopefully (20 – 25 min)

“Alright class, we now get to play a redox relay! Please listen carefully so I don’t have to repeat myself too often. The goal of the game is to solve all six puzzles and put your winning cards in the right column of this chart – point to a parchment paper with a differences T-chart. First you need to assign one person to communicate with the mediator and one person to put the card on the chart. All the rest of your team will stay at the assigned lab bench at all times. (rephrase in a simpler way if possible). This is where the relay part comes in Got it? The communicator will come to the mediator (show myself walking hastily from the lab bench to the front of the room) and the mediator (standing here) will hand

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them an envelope with a card in it (act like the mediator). The card contains three or four compounds on it. Assign oxidation numbers to each compound or element in the boxes below them.” (put example on board) “once you fill that out, you bring it back to the mediator who checks if they’re right. If they’re right, he gives you another envelope with the same number on it. In that envelope is another card that you’ll have to fill out and bring to the moderator to check. The cards won’t take long to answer but you’re competing against each other so you have to be fast and work together. Also, you have two charts on your lab table that will help you solve the puzzles. If you complete both envelopes with the same number on it, you get a card with a clue on it. The clue tells you which side of the chart you put it under (demonstrate). Once all six cards are in place on the chart, you win!! I know it sounds like a lot but it will be very fast paced and organized, like a RELAY!”

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“Alright class, thank you for playing and having such great attitudes. So let’s debrief and reflect on the game. I want you to take this post-it note and a question for me about the game on it. Think about redox reactions in terms of their definitions. What were the similarities between the interactions between the moderator and the communicator and the kinds of interactions that happen in redox reactions?”