

Star Spectra Lesson Plan

SIOP Lesson Plan Template

Class & Lesson Information

Date: Day 2: Wednesday	Grade/Class/Subject: Astronomy - mostly 11 and 12 Students have already finished Earth Science and studied many of these concepts last year, so today's lesson should be mostly review. This gives me some liberty to introduce more complexity in terms of vocabulary and science content in this course. I would slow things down if students were new to these concepts or if I had lower WIDA skill levels.				
Class setting (# of students & MLs, WIDA level if applicable, lesson duration, etc.): 18 Students total 3 MLs - average composite score is about 4 - Given the language skills of my students I feel comfortable giving them the same materials as my native speakers, but they will need more frequent check-ins and supports than other students might not need. 57 minutes per class period					
Grouping explanation: I want them to get a chance to see different versions of spectra and the diversity of evidence they contain, so I want each student to have individual time to explore. However, I want them to work in pairs so they have a chance to communicate with each other. So the main activity will be mostly individual and pairs, giving them more of the hour to explore the content and converse with each other.					
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; text-align: center; vertical-align: top; padding: 5px;"> Whole Class They will listen or share to the whole class at the end of the class when they present about their assigned stars </td> <td style="width: 25%; text-align: center; vertical-align: top; padding: 5px;"> SmallGroup Small groups will only be a focus during the bellwork </td> <td style="width: 25%; text-align: center; vertical-align: top; padding: 5px;"> Partners Students will work in partners for most of the hour, during the star spectra activity, and when they prepare and share their whiteboard </td> <td style="width: 25%; text-align: center; vertical-align: top; padding: 5px;"> Independent Students will explore the first part of the simulation on their own, but they are allowed to talk to others around them and their partner. </td> </tr> </table>		Whole Class They will listen or share to the whole class at the end of the class when they present about their assigned stars	SmallGroup Small groups will only be a focus during the bellwork	Partners Students will work in partners for most of the hour, during the star spectra activity, and when they prepare and share their whiteboard	Independent Students will explore the first part of the simulation on their own, but they are allowed to talk to others around them and their partner.
Whole Class They will listen or share to the whole class at the end of the class when they present about their assigned stars	SmallGroup Small groups will only be a focus during the bellwork	Partners Students will work in partners for most of the hour, during the star spectra activity, and when they prepare and share their whiteboard	Independent Students will explore the first part of the simulation on their own, but they are allowed to talk to others around them and their partner.		
Unit/Theme: Modern Tools of Astronomy - Light / Spectra	Standards: NA				
Content Objective(s): Students will explore Absorption Spectra to see the different kinds of information they can tell us about stars					

Language Objective(s):

Students will decode Absorption Spectra to identify a star's composition, class, and unique features.

Key Vocabulary:

Absorption Spectrum / Spectra

Wavelength

Emission Spectra

Nebula

Star

Redshift

Blueshift

Materials (supplementary & adapted):

- Star Spectra Handout
- How to Log into Gizmo Instructions
- Their Computers
- Whiteboard, Marker, Eraser

Higher-order questions/tasks:

In the latter half of the Star Spectra Simulation when they are asked to sort through the star spectra to find a corresponding matching one and describe what qualities it has and thus make it unique.

Lesson Sequence (Pre-/Opening activities):

Time allotted	Activities (Teacher talk, action, etc.)	Other notes
---------------	---	-------------

~5 min	Bellwork Students will do a think-pair-share regarding a warm-up question on the board. This time I think something like: <i>Tell your group mates how absorption spectra are created and roughly what they look like.</i> As students interact in the share portion, and as they share out to the whole class, students will get some feedback about how well they retained the key ideas about absorption spectra from yesterday.	Today they will work with absorption spectra data from stars quite a bit, so I want them to review these spectra in particular. This should hopefully help connect them to ideas from yesterday's lesson, and also this gives them a chance to talk to each other and use yesterday's vocabulary. They also get to hear what other students remember, and how they conceptualize the prompt.
~3 min	Review Learning Objectives (<i>Listed Above</i>) I am going to try and draw their attention to how absorption spectra are a main focus for today, and that they will do a similar kind of task as yesterday, with using spectra to identify elements. This should hopefully again remind them of yesterday's lesson.	I am also hoping to remind them that elemental spectra are in many ways like fingerprints, and I will try to get them to tell me about how fingerprints lets us identify specific people as an allusion to how elemental spectra are used by astronomers - connecting to their background knowledge.

Lesson Sequence (Main activities):

Time allotted	Activities (Teacher talk, action, etc.)	Other notes
---------------	---	-------------

~30 min	Star Spectra Simulation Students will work in pair teams to use a GIZMO simulation to look at stellar absorption spectra and see what kind of information those spectra hold. At first they are going to each look at 2 of the 4 beginner stars and use the spectra to identify what elements they contain, and then classify their stars into a set of seven star classes. -At first they will work alone to get a chance to match spectra individually, then they will come together and share what they found with each other. I am going to ask them to show and tell what they saw, so that they can model for each other how they worked with the two stars they are each responsible for. Their interaction and sharing should give them some feedback, and I'll be constantly rotating to check in as well. -In Part 2 they will each receive a more unique star from numbers 5-10. Each of these stars has a special feature that makes them atypical and many often do NOT contain all their typical ingredient elements. Students will first be tasked with as a pair figuring out which star matches their description, then measuring what elements it has and what class it is, similar to part 1.	
------------	--	--

Lesson Sequence (Post-activities):

Time allotted	Activities (Teacher talk, action, etc.)	Other notes
---------------	---	-------------

~15 min	Star Share Out Pairs will use a whiteboard to write what they learned about their unique features star (5-10). After adding all their data to their whiteboard, they will practice what they want to say to the whole class to share. For their star they need to share: • Which number • What color it is • What ingredient elements it contains • What Class it is • What it's unique feature is • How that unique feature is shown by the spectra So they will be sharing some simple data, but they will also need to share some more complex explanation of their star as well.	
~5 min	Final Question and Review Objectives As we review the final objectives I will ask them to answer a final question on their handout as an exit ticket. I'll ask them to answer: <i>Other than your star's unique feature, what other unique feature that is visible in a star's spectra did you find most interesting and why?</i>	