Three examples of lesson plans that are responsive and supportive to individual differences among students.

In the following lesson plans I will provide evidence for the ways in which I have planned lessons to support individual differences among students. In example #1 students use a think-pair-share protocol to develop a group definition of the scientific definition of reproduction. This supports individual differences among students by providing a way to engage in academic vocabulary by using peer language to interpret the definition of the term and to rephrase that meaning in a student’s own language. It also supports the development of peers as holders of knowledge by drawing the definition from the group of students. In the next highlighted section of the lesson plan there is a cue to a power point slide that shows examples of words that signal the opposite of the word by using the letter a as a signal, i.e. asymmetrical. The slide shows asymmetrical = not symmetrical. This slide supports individual differences between students by scaffolding language use by identifying this signal in defining the vocab term asexual. The third way in which example #1 supports individual differences between students is by the use of models in explaining science phenomenon. This is evident in the learning targets. There is a prompt for students to engage in this practice on their daily sheet (which is not visible here.) The students are asked to construct a model to communicate their understanding of asexual reproduction using words and pictures. This practice supports individual differences between students by engaging them in an expression if their knowledge that is not restrained by language alone. It also aids in the use of language by the use of labels and developing ability to explain the phenomenon using text.

In example #2 the lesson supports individual differences among students by again using a think pair share protocol to activate prior knowledge and share that with the group. This supports students by providing them with a chance to co-construct a definition with their peers using prior knowledge. The next ways in which I plan to support students are in a small group project. In this project written instructions are provided to support students by giving them a reference tool that they can refer to if needed. The students are also placed in groups that are designed to provide mentoring opportunities for students. This supports individual differences in learners by peer mentors that can assist in the specific needs of individuals. The activity itself also supports individual differences among students by providing the students with a concrete kinesthetically designed model to develop knowledge of what creates the boundaries of a watershed. This supports students in many ways, including the ability to make and test hypothesis, constructing evidence based arguments and develop explanations without the confines of text.

In example #3 a jigsaw model is used to support individual differences among students. The students are organized in groups of four by design. These groups are designed to support students by being academically heterogeneous. This supports students by creating the opportunity for students to help one another in their developing understanding of the topic. The group is provided with a graphic organizer to organize their work. This supports students by helping them focus on the task rather than the organization. After the groups complete different sections of the graphic organizer the knowledge of the small groups is shared out to the big group. This supports students by hearing the content knowledge in the language of their peers and provides groups to be holders of knowledge.

Please refer to the highlighted sections in the lesson plans below.
### Example #1

#### 7E Science Lesson Plan Day #2

<table>
<thead>
<tr>
<th>Lesson Author: David Sanford</th>
<th>Topic: Asexual and Sexual Reproduction</th>
<th>Grade Level: 8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NGSS Standards</strong></td>
<td>MS-LS3-2 Students who demonstrate understanding can: Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.</td>
<td></td>
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<tr>
<td><strong>Common Core</strong></td>
<td></td>
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<tr>
<td><strong>State Standards</strong></td>
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</tbody>
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**Guiding Question**

Why does asexual reproduction result in offspring with identical genetic material?

**Learning Target(s)**

SWBT:
- I will be able to define asexual reproduction.
- I will be able to describe why asexual reproduction results in offspring with identical genetic information using a model. (words and pictures)

**7E Model of Inquiry (Attend to each component of the instructional model)**

- **Elicit**
  - Think to yourself for a moment.
  - What do you think reproduction means? (wait)

- **Engage**
  - Share your answer with your table partner
  - Ask for 2 students to share their partner’s answer.
  - Ask students to write their definition on their daily sheet.
  - Next slide: Learning targets (3 min)
    - Ask a student to read the first learning target.
    - Ask a student to read the second learning target.
    - Ask “what does a model look like?” (words, pictures, labels)

- **Explore**
  - Use powerpoint to explore asexual reproduction (5 min)
    - “Follow along, take notes and answer the question prompts as we go. Ask questions as needed.”

Using the powerpoint –

Visit the big question (2 min) – Think about the parts we identified yesterday.

Ask: (5min)
### Introduce Todays Question
- Use repro slide to orient students to asexual repro (potato)
- Think about the language - Ask students to “fill in the blank” out loud. Follow up Q – “What makes you say that?” – looking for evidence. Use this slide to make visible the distinction that the A in asexual signals that it means “not sexual”

### Formative Assessment:

#### iv. Explain
- Use powerpoint to explain asexual reproduction. (15 min)
  - Definition of asexual reproduction – read aloud
  - Use potato slide to explain the tubers and how they reproduce a new potato plant. Note that there is one parent and the new plant (offspring) has identical genetic information
  - Does not involve sex cells. (What does this tell us about sexual repro?)
  - 1 parent! (if applicable, what can we infer about sexual reproduction?)
  - Mitosis is the cell division process that makes it happen. What do you know about the genetic information in the two daughter cells after cell division? What makes you say that?
  - Types of asexual reproduction. Briefly explain what is going on in each example. Ask students to think about similarities between types. How is genetic material passed on in each type?
  - Our friend the potato. Walk through the process of reproduction of a potato plant. Focus on 1 parent and identical genetic info

### Formative Assessment: Questions, report outs, notes

#### v. Elaborate
#### vi. Evaluate
#### vii. Extend

**Prompt students to finish their daily sheet.** (20 minutes) Move through the room to monitor and extend
Collect before they leave.
If students finish early: read starting on page 116, multiple births on 116.
If time to extend with class: Introduce my kids and look for similarities and differences between them and parents – to introduce genetic variation.

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**Example #2**

**SCIENCE LESSON 3: What is a watershed?**

**Teacher:** David Sanford  **Subject/ Grade:** 7th Grade

**Science**

**Standards/#**
- MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
- MS-ESS2-4 Develop a model to describe the cycling of water through Earth’s systems driven by energy from the sun and the force of gravity.

**WA State Sustainability Standards**

Standard 1 - Students develop a knowledge of the interconnections and interdependence of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, national, and global levels.

**Learning Targets (K - Knowledge, R - Reasoning, S - Skill, P - Product)**

Students will be able to:
- identify a watershed as a physical component of an ecosystem. (K)

**Summary of Learning Activities:**
- Using inquiry, students will use a simple model to explore the boundaries of a watershed. The watershed provides the boundary of the ecosystem we are going to analyze.
- Opening reflection discussion, listening for prior knowledge and misconceptions of watersheds.

**Instructional Practices**

- think/pair/share, journal reflection, model activity, guided observations

**Language Demands**

**Content Specific Vocabulary:**
- watershed
- ecosystem
- runoff

**Language Functions:**
- analyze, infer

**Formative Assessments**

The essential question is "what is a watershed?", and what creates boundaries between watersheds? I would like to know about students understanding of the term. I would like them to understand that a watershed is an area in which all of the water flows to the same place.

**Formative and Summative Assessment Evidence**

**Formative:**
- Think pair share

**Summative:**
- Information on the board and journal reflection

**Leveraging Student Assets:**

In using t/p/s students have an opportunity to voice their prior knowledge and personal experience.

**Differentiation/ Accommodation**

Written directions will be provided to students, groups have been intentionally designed to provide mentoring possibilities.

**Student Voice**
### Teaching Outline & Procedures

<table>
<thead>
<tr>
<th>Time</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 minutes</td>
<td>Have students read learning target. Have a students read “A watershed is an area of land where all of the water flows to the same place.” Then ask how they could tell where the boundaries of the Sequalitchew creek watershed could be. The students will reflect in writing for 2 minutes and share with their partner. Then pairs will share out and teacher will record their thinking on the board.</td>
</tr>
<tr>
<td>10 min</td>
<td>Project set up. Each pair will be given a supplies (11x17 paper, spray bottle with blue dyed water and markers) an instruction sheet and a data collection sheet. Students will be instructed to crumple and fold paper to represent topography. Students will be prompted to make predictions of where the boundaries of the watershed may be.</td>
</tr>
<tr>
<td>20 min</td>
<td>Students will spray their watershed model and make observations of how the water moves, where it goes and where the outflow separates. They will mark these area on their model. Students will record their findings on the observation sheet.</td>
</tr>
<tr>
<td>10 min</td>
<td>Report out - Students will share their predictions and findings with the class which will be recorded on the board.</td>
</tr>
<tr>
<td>5 min</td>
<td>Closing written reflection “What did you discover today that helps you understand the creek better?”</td>
</tr>
</tbody>
</table>

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**Example #3**

I. Learning Objective: I will be able to explain what fossils are and the various ways in which they are formed

II. Grouping Strategies: Individual and table work groups

III. Evidence of Learning:
   - Informal - self assess with magnet
   - Formal – Graphic organizer, homework pg. 81-85 and pg 91 q’s 2,4,5,6,9

IV. Materials:
   - Powerpoint – computer, projector
   - Graphic organizer
   - Fossils (if possible)
   - Clay
   - Container

V. Safety: n/a

VI. Implementation Plan – Before class label tables with A-E (dry erase) If A will be gone through as a whole class only label tables B-E
• Upon entrance, have students open books to page 91.
  o Review questions 1,3,7 (5min)
  o Ask a student to read their answer. Example questions for starter. Do you agree with that? Did anyone have something different? How does this X help explain how the earth changes over time?

Mini Lesson:
• Write “How can fossils tell us about changes of the Earth over time?” on the board.
• Powerpoint on Vantage WA, petrified forest (15 min)
  o Start with slide of Vantage,” has anyone been here?” What was it like?
  o Present current environmental info for Vantage, ask what they can infer from the data and photo
  o Show Ginkgo slide, present organism climate preferences. Ask, “What can infer about the environment of Vantage if these trees lived here once?”
  o Show fossil slide, introduce fossilization cause. Ask “What do these fossils help us understand about the way the environment has changed in this place over time?”
  o Explain that “I have a short video to introduce fossils.”
  o Play fossil video

Connection:
• Fossils are organisms (or the evidence of organisms) preserved through geologic process that provide clues to the earth's past. Turn to page 81

Teach:
• Hand out Graphic Organizer.
• Explain that we will be engaging in a jigsaw activity. The idea is to learn with and from one another.
• Ask, “What does a group that is working together well look like?"
  o What does listening look like?
  o What does participating look like?
  o Write answers on board
• “You will be working in groups of four. Look at the letter in corner of your table. Find the nearest table with the same letter, this will be your group.
• Explain to group that they will have 15 minutes to complete the row assigned to them on the graphic organizer.
• Explain that the group will select a spokesperson.
• After 15 minutes the spokesperson will be expected to report out to the group. The spokesperson will also be expected to answer questions asked by other classmates.
• If needed or appropriate – go through first row as whole class to model answers
- Give groups allotted time to work, move around class to help process
- In alphabetical order, have the groups share. When there are multiple groups of the same letter, have them answer alternating columns.
- Ask clarifying and extending questions based on report out.
- Students will work on completing the rest of the G.O. in their groups of 4 (if appropriate) until the complete or time to move on,
- If time allows – introduce sedimentation and trace fossils with mold demo

Active Engagement:
- Work on graphic organizer of 5 types of fossilization, trace fossils and sedimentation.

Link:
- Fossils can help us understand what has happened in the earth’s past
- What new questions emerge in student thinking?

Independent Work:
- The students will turn in the graphic organizer by the end of class or the next day.
- HW: Book pages 81-85, pg 91q’s 2,4,5,6,9

Close:
- Introduce sedimentation and trace fossils through fossil imprint demo.
- Fossilization will build on the concept of uniformitarianism by identifying geologic process that happens today and how it explains evidence of the past, like fossils.
Reflection:

1. What evidence do you have of student learning?
2. What teaching decisions were most effective? Why?
3. What teaching decisions were least effective? Why?
4. During independent work time, what did you learn about individual students as learners and how did you and/or will you use this information to inform instruction?
5. 
6. Comments:
7. Note: it will be helpful to capture in this space changes you might need to make to your changes given what occurred today.