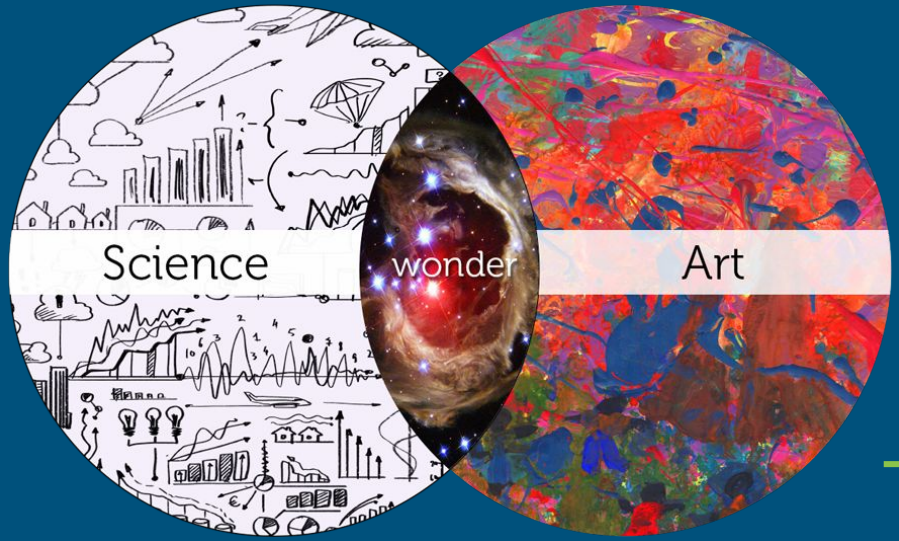
Science and Art: The Value of Integration



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Your Presenters

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Participant Outcomes

- Understand the connection between science and art and the value of integrating both in the classroom.
- View examples of how various art mediums can be incorporated into secondary science classrooms.
- Plan for art incorporation in your context.

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How does this painting demonstrate the integration of art and science?

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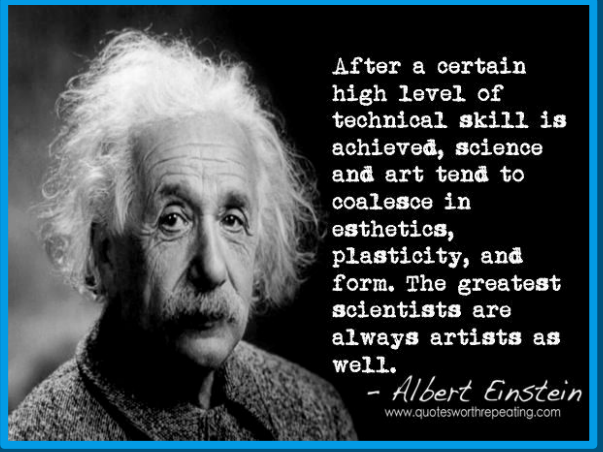
To develop a complete mind:
Study the science of art;
Study the art of science.
Learn how to see.
Realize that everything connects to everything else.

- leonardo da vinci



There is an art to science, and a science in art; the two are not enemies, but different aspects of the whole.

(Isaac Asimov)

izquotes.com

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According to Scientific America

Camouflage for soldiers in the United States armed forces was invented by American painter Abbot Thayer.

Nobel laureates in the sciences are seventeen times likelier than the average scientist to be a painter, twelve times as likely to be a poet, and four times as likely to be a musician.

Earl Bakken based his pacemaker on a musical metronome.

Steve Jobs described himself and his colleagues at Apple as artists.

Japanese origami inspired medical stents and improvements to vehicle airbag technology.

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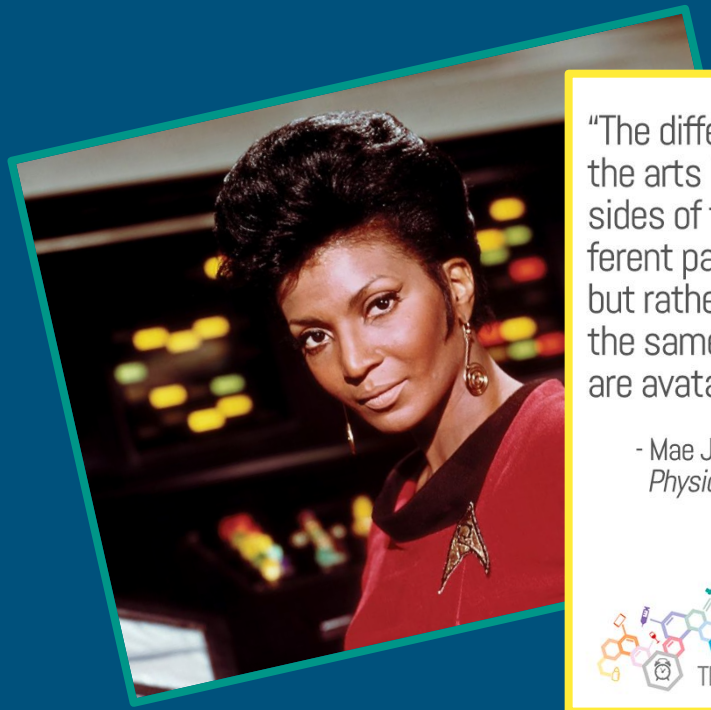
What do these two women have in common???



"The difference between science and the arts is not that they are different sides of the same coin even, or even different parts of the same continuum, but rather, they are manifestations of the same thing. The arts and sciences are avatars of human creativity."

- Mae Jemison
Physician + Astronaut

TheScientificParent.org

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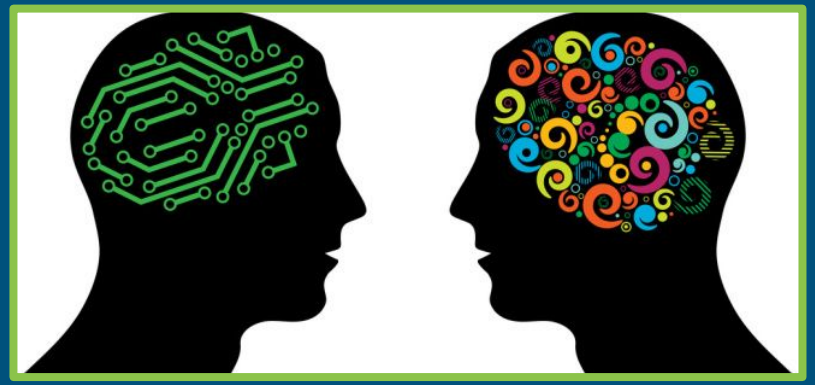
Why Arts Integration Improves Long-Term Retention of Content (Rinne et al., 2011)

- Repeated rehearsal of information AND how information is elaborated on or linked to other information positively affect long-term retention
- Placing information in some context establishes a more “elaborate memory trace”
- Emotionally charged content is easier to remember
- Information presented as pictures is better retained

Why Arts Integration Improves Long-Term Retention of Content (Rinne et al., 2011)

- “To turn ho-hum learning goals into activities requiring some effort to comprehend, (Rinne et al.) suggest teachers turn to the arts and call upon students to find content embedded in some type of art form.”

How might we incorporate art in the secondary science classroom???



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I. Introduce or Review Topics Using Art Forms: Visual Art

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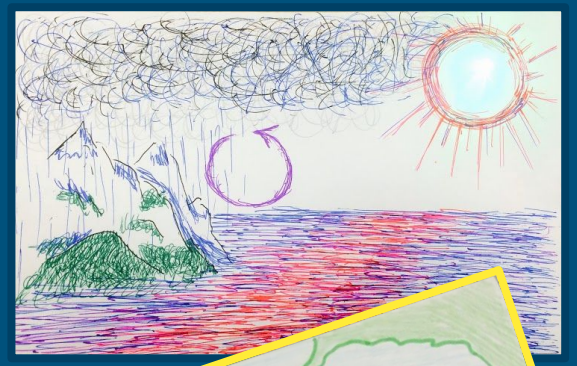
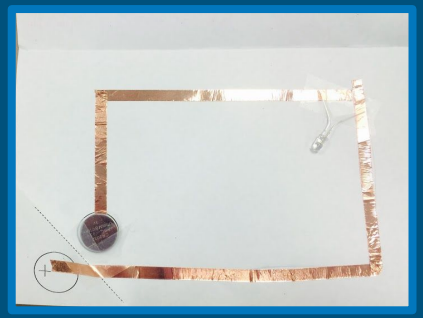
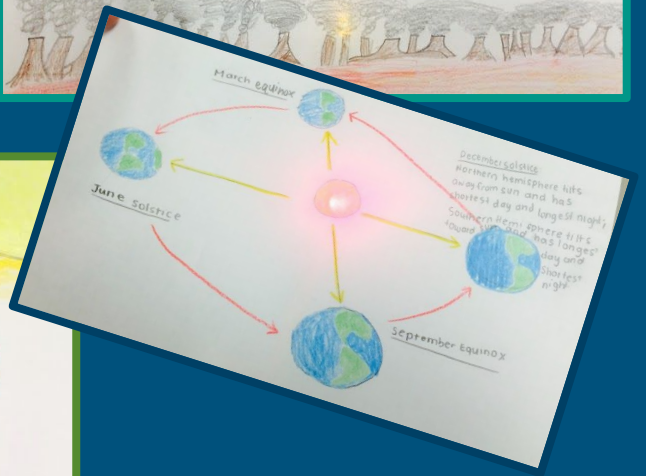
II. Ask Students to Demonstrate Understanding Using Art Forms







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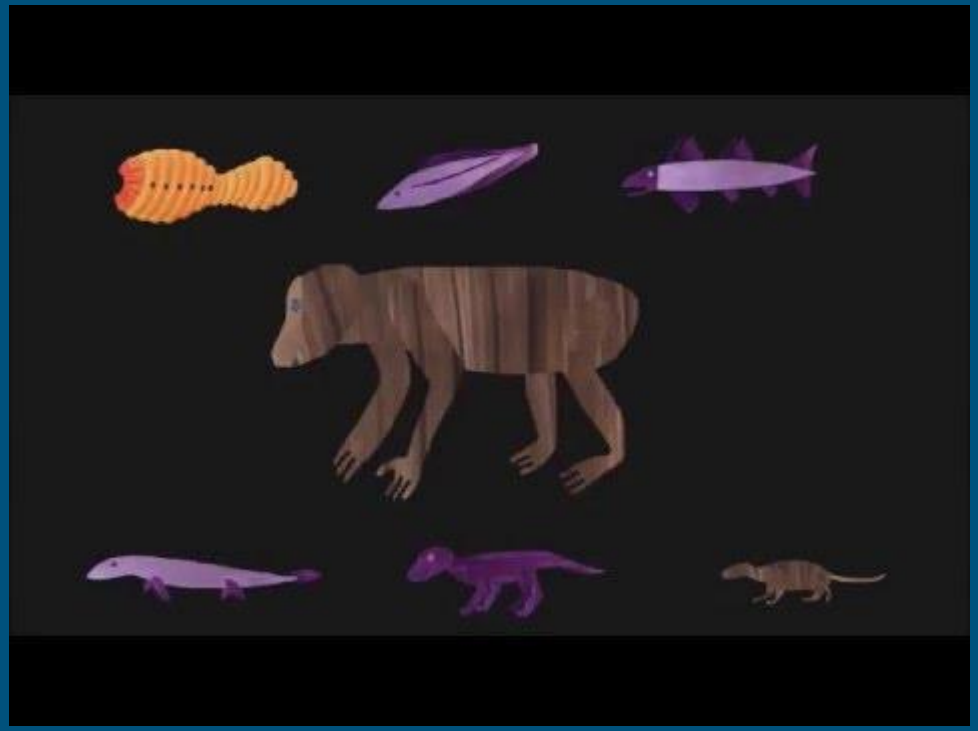

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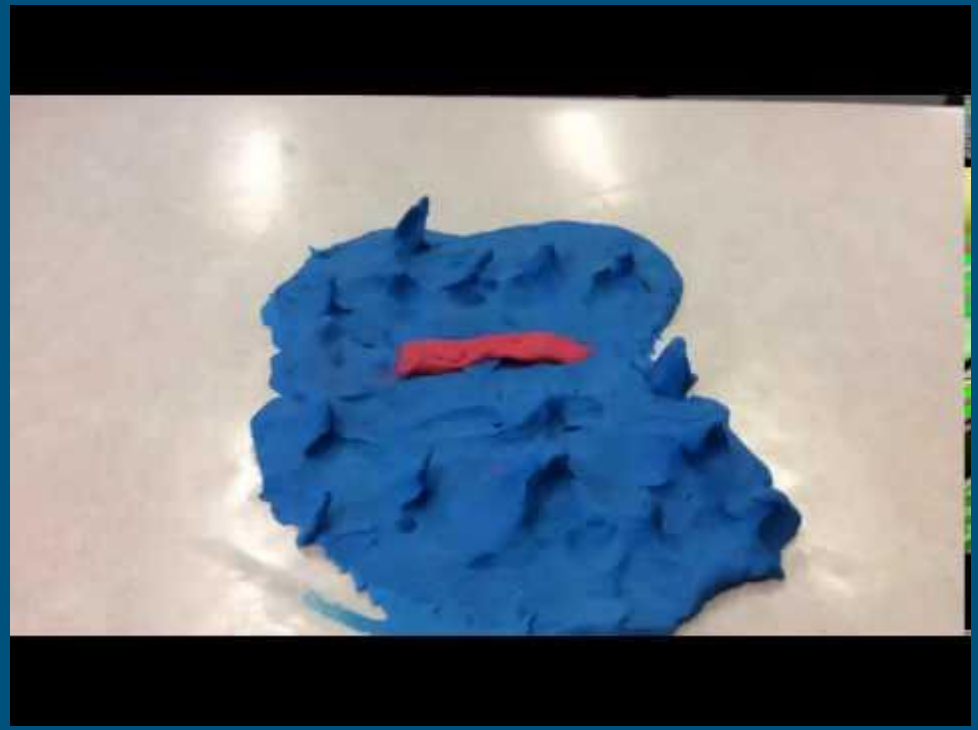
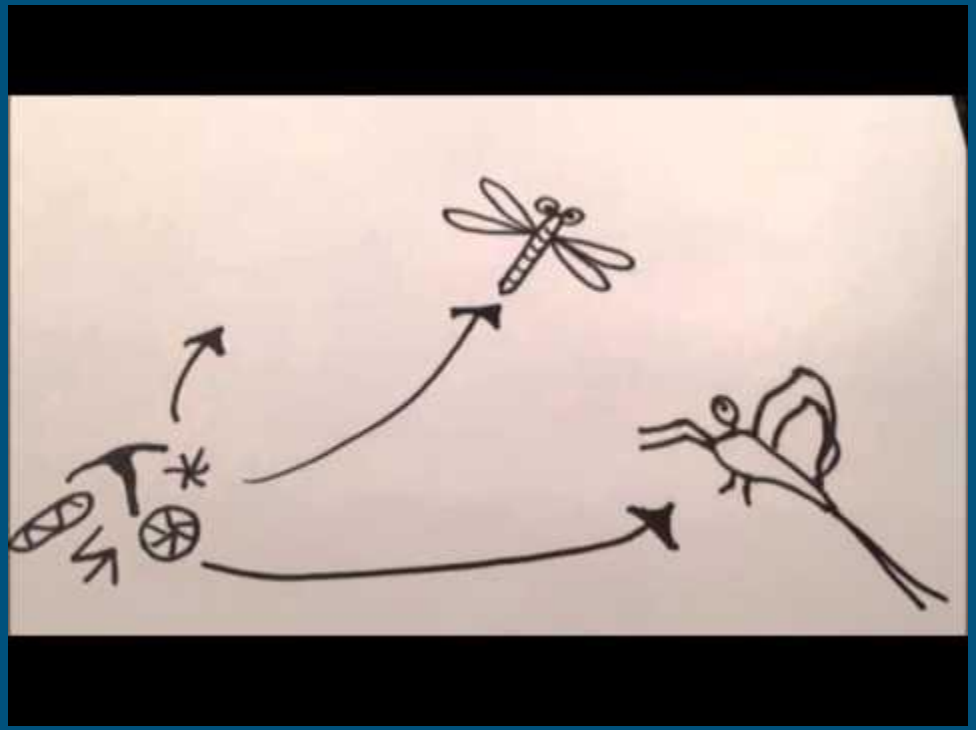


II. Ask Students to Demonstrate Understanding Using Art Forms

III. Ask Students to Apply Knowledge to Create Unique, Meaningful Artwork



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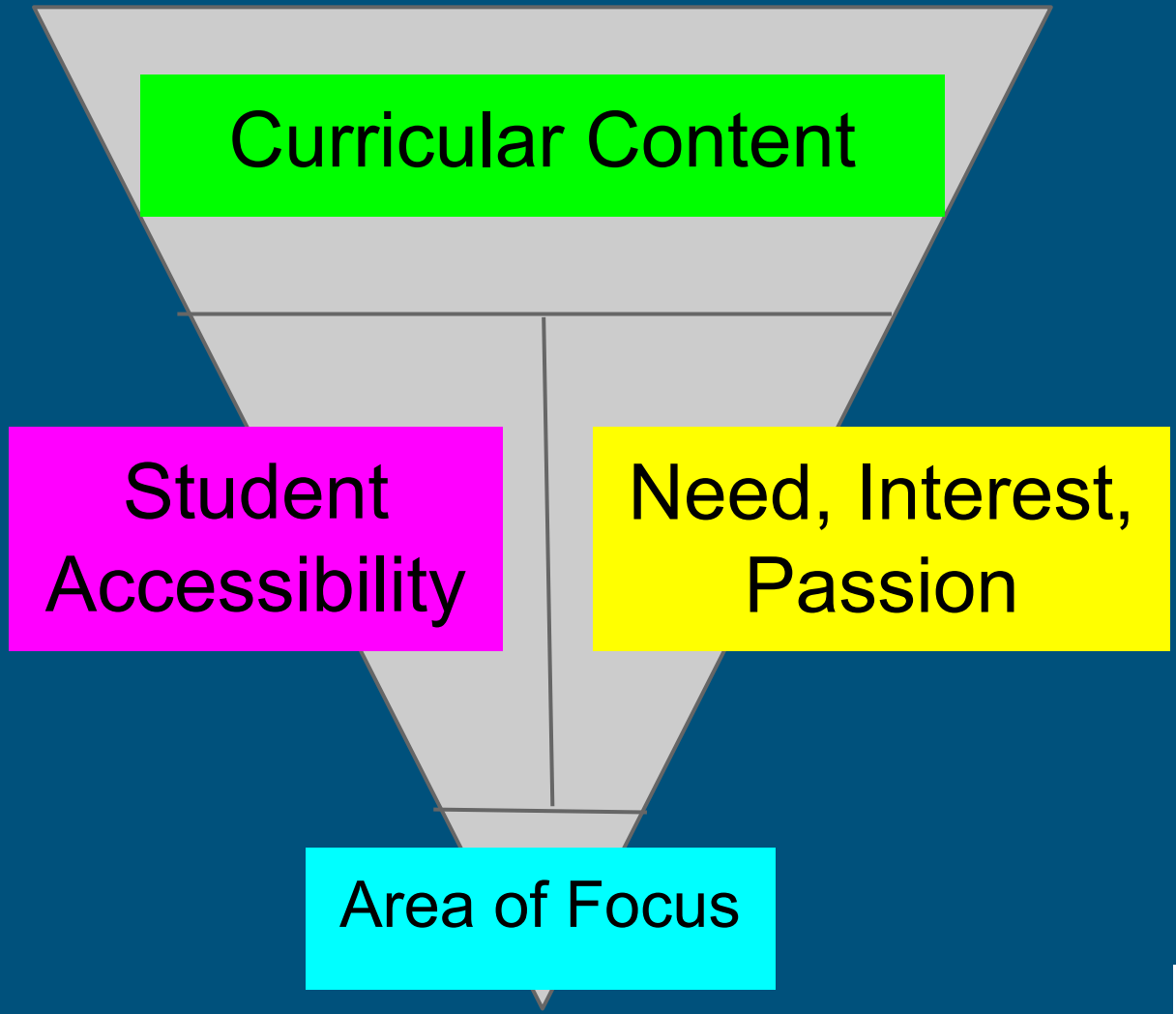

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Considerations when selecting and assigning artwork

- What is my purpose in showing or requiring art in this context?
- What questions and/or discussion might I elicit about the art as well as the content?
- Am I assigning artwork that allows for creativity and differentiation?
- What will a successful submission look like? Will it be the same for each student?

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Considerations when assigning artwork

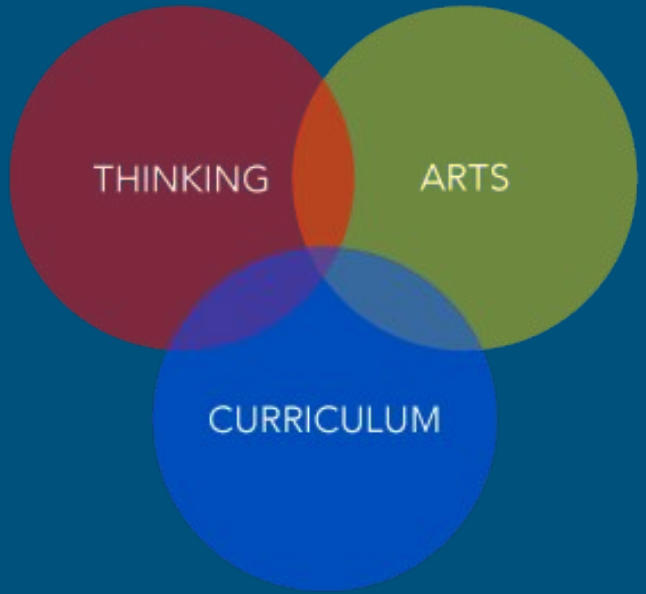
- Have students submit a proposal
- Build in benchmarks and feedback
- Assess the entire process, not just the finished product
- Allow for different types of media including digital

Teaching Students Basic Art Skills

- Composition
- Perspective
- Value
- Color
- Lighting

ARTFUL THINKING

Stronger thinking and learning through the power of art.



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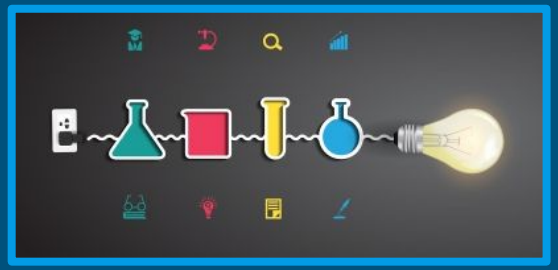
Your Turn!!!



Create a prototype (digital or on paper) of how you might integrate art and science in your context.

Suggestions

- Select a science topic you teach and want to spend more time on and in which students might develop art
- Decide what you want students to get out of the activity (content, artistic expression, etc.)
- Sketch your idea and get feedback
- Develop your prototype