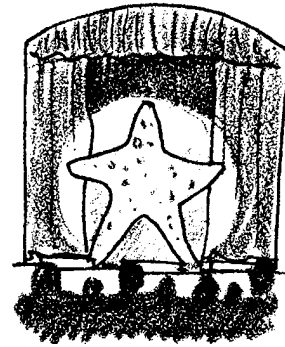


Not Just Your Ordinary Research Reports*

Contributions to this lesson from Patty Enright and her students, Stillwater, MN, and numerous other teachers.

Key Concepts

1. Student research projects can be tailored to the preferred learning style of the students.
2. Research projects can serve as very effective assessment tools, provided the criteria for assessment are clearly established.



Background

By this time in the unit, students may be ready to conduct independent or small group research projects. Topics may include individual marine organisms, marine-related issues, or a very recent “hot” marine topic. Obviously, students will be most motivated when researching a topic of interest to them.

The knowledge and information that students can teach each other makes the whole group presentation/report-out aspect of the research project important. The options for presentation should be planned to engage the multiple intelligences of the students in the classroom. The following list may stimulate thoughts on the breadth of options:

To engage the **kinesthetic learners**, have students:

- make up a simulation
- make up a dance
- create a role play that demonstrates
- design and/or play a game
- make a sculpture, diorama, or model
- teach others how
- draw, illustrate, or mindmap

To engage the **visual/spatial learners**, have students:

- make a cartoon
- use a computer to create
- draw, design, sketch, or paint
- make a flow chart, mindmap, graph, or timeline

- create a code, color, or shape system
- create a collage, photo, picture, or video
- make murals or bulletin board displays
- create and conduct a guided imagery to teach

To engage the **musical learners**, have students:

- write and perform a song, rap song, or other musical composition
- write and choreograph a dance about what they have learned
- give a presentation with appropriate musical accompaniment
- present and explain how the lyrics of a song relate to the topic
- find and play a musical selection that demonstrates
- write and produce a class musical

Materials

For the class:

- access to numerous and assorted resources and multi-media materials (tape recorder, computer, and video camera are great additions to art supplies, paper, cardboard boxes, etc.)

Teaching Hints

Listed below are just a few ideas illustrating ways students may present their research findings to peers. Encourage students to think about their own preferred style of learning and teaching. Facilitate their creativity.

Sea Raps

Students select the appropriate music to establish the rhythm and then write to the beat. Ample rehearsal time for performance is necessary.

The following examples were written by Patty Enright's Grade 5 students in Stillwater, MN:

ABALONE

(By Laurel, Ellen, Jenny, Nicole)

The abalone's a gastropod lined with mother of pearl.
It makes beautiful jewelry that would please any girl.

The animals respire and discharge wastes,
Through a row of holes at one side of the base.

Old holes fill up, and new ones appear,
As the animal ages, year by year.

The abalone has one muscular foot,
That some people like to cook!

SEASTAR

(By Jodie, Kristi, David, Ryan)

I am a sea star. I regenerate my rays.
I scavenge on the bottom for some prey.

When I crawl around, I'm looking in vain,
For something nutritious from the food chain.

I go to the rocks to find some food.
If nothing's there, I'm in a bad mood.

When the tide comes in, I find a rock.
I attach to it like your foot to your sock!

Hypercard Database

A tide pool creature database constructed by students using Hypercard can become a valuable resource for other students.

Multi-Media Presentations

Encourage use of CD-ROM or other available technology. The BIO-SCI CD-ROM discs include marine invertebrates. Students can select a group of images to address big ideas like:

Feeding Tools/Techniques in the Intertidal
Ways Animals in the Intertidal Move
Ways to Hold on in the Intertidal
Ways to Stay Protected in the Intertidal.

Coordination of these images with music or a narration makes an interesting presentation.

Skits/Plays

The following is an example of an “interview” with a marine invertebrate which is very engaging when presented using only a few simple props.

Interview With a Seastar

Reporter (excitedly): Good day to you all. We are about to embark on a rather unique interview with a common purple sea star. Ah . . . there he is . . . the tide has dropped and now we can go over and hear what he has to say.

Reporter: Good day to you, Mr. Purple Seastar. Which arms do I shake?

Starfish: You can shake any arm; they are all the same to me. Oh, yes . . . my real name is *Pisaster ochraceus*.

Reporter: *Pisaster ochraceus*? Whew . . . did I say that right?

Starfish (annoyed): It's a tongue twister, but the other name is a misnomer. Some of my brothers and sisters are brown or orange, not purple. Furthermore, that question has brought up a grudge . . . we are not fish. If you wish to give us a slang name, call us sea stars.

Reporter (apologetically): My apologies. Now, Mr. Seastar, I have another significant question . . . where is your head . . . or what's an arm or a leg? Your anatomy is certainly strange!

Starfish (annoyed): We're not strange! You look odd! For the benefit of your audience, I'll outline my significant features. I have five arms arranged around a central disc. Below the arms you may notice my legs. They are arranged in double rows beside a groove under each arm. I have about 2000 legs. I'm dextrous. That means I can operate each leg independently. My legs are little suction cups; each one is hollow and is connected to a tube inside each arm. Well, these tubes connect to other tubes which connect to a little sieve plate on my topside. Whew! . . . it's a complex system! Can you see the sieve plate?

Reporter: The little white disc on top of your body near the center?

Starfish: Yes, that's it! The sieve plate allows water to flow in and out of the tube system, and muscles in each tube and foot control the water flow. Here, I'll demonstrate. I'll pump water into this foot. Watch it extend. Now, I'll contract the muscles at the tip of the foot and a suction cup is formed. That's how I hold onto the rocks. When I draw water from the foot, it contracts. By alternately expanding and contracting each tube foot, I can move slowly.

Reporter: How do you know where you are going?

Starfish: I don't have a lead arm. Any arm can lead . . . the others will follow. It's just natural. I have little eyespots at the tip of each arm . . . take a look . . . see the little patch of white spines. That skin is sensitive to differences in

light or dark. I cannot see you, but I can detect your shadow. By the way, thanks for your shadow. Don't move! The sun tends to dry me out, a very serious situation for sea stars. I can only breathe through moist skin. That's why we sea stars cluster near the low tide mark.

Reporter: What's your favorite food?

Starfish: Mussels first, barnacles second.

Reporter (astonished): But they have shells! How do you eat them?

Starfish (bored): It's so easy. I render them into soup first . . .

Reporter: Soup!

Starfish: . . . as I was saying . . . my mouth is underneath, connected to two stomachs, one above the other. Well, I can push the lowest stomach out through my mouth. Yes, it's all true! Here is how I do it: I climb on a mussel and attach dozens of legs to the mussel's shell. While the mussel desperately tries to remain tightly closed, I exert a steady pull. Usually I have greater endurance, and slowly the mussel shell begins to gape open. Then I throw out my stomach, covering the helpless mussel. Strong stomach acids render the mussel into a soup. Afterwards, I pull my stomach inside, leaving a clean mussel shell beneath.

Reporter: That's an incredible story! And, you don't even need teeth! I've heard rumors that you can replace lost parts.

Starfish (modestly): Well, if I lose an arm, I can usually grow a replacement in a few months. I hear humans can only replace their fingernails!

Reporter: That's true. Who is your worst enemy?

Starfish (angrily): Humans! At low tides, they descend like a plague and remove my brothers and sisters. I've heard that humans try to preserve us so that we may collect dust on a mantle shelf. I have more to offer alive than dead.

Reporter: It is sad, isn't it? I notice that the tide is rising. I'm not as well suited for these cold waters and pounding waves as you are. So, I must depart. Thank you very much, Mr. Starfish . . . er . . . Seastar. Good luck with your next meal!