

Teaching Thinking: Spatial Thinking

Angela Hasan

Teaching thinking with gifted students has been on the forefront in the elements that comprise a quantitatively differentiated curriculum for these students. Gifted education references critical thinking, creative thinking, and skills of logic as important elements of a such curriculum. In addition, the introduction of spatial thinking provides another element to a differentiated curriculum. References indicate that spatial thinking ability is an important effect in many fields of study such as mathematics, engineering, economics, and architecture. The following resources have been provided as an introduction to teaching spatial thinking with students of all ages and grade levels.

Spatial Thinking

The National Academy of Sciences defines spatial thinking as a constructive amalgam of three elements: *concepts of space*, *tools of representation*, and *processes of reasoning*. Space provides the conceptual and analytical framework within which data can be integrated, related, and structured into a whole. Representations—either internal and cognitive or external and graphic, linguistic, physical, and so forth—provide the forms within which structured information can be stored, analyzed, comprehended, and communicated to others. Reasoning processes provide the means of manipulating, interpreting, and explaining the structured information.

National Academy of Sciences

Learning to Think Spatially:

Geospatial Information Science (GIS) as a Support System in the K-12 Curriculum (2006)

GEOCACHING (<https://www.geocaching.com/play>)

Geocaching is way of using spatial thinking to find hidden treasures in your community. All you need is the Geocaching free app download to get clues to locate Geocaches (treasures) in your neighborhood. Children can learn practice concepts of space, technology to locate geospatial location, and problem solving.

GOOGLE EARTH (<http://earth.google.com>)

Students today can explore the world terrain and people without leaving home using Google Earth software (free download) that provides children access concepts of spatial thinking by exploring the earth. For example, let's think about touring the earth using a mobile phone, iPad, or computer. Geospatial technologies like GPS provide opportunities for students to view,

problem solve, and analyze data from locations they have not visited in the world. Before you begin your Sightseeing Tour, explore the Google Earth with your Desktop, Web, or Mobil device by using this link: <http://www.google.com/earth/explore/products/>

Next, let's take a Tour of 3D Buildings below:

<http://www.google.com/earth/explore/showcase/3dbuildings.html#tab=baseball-stadiums>

Download Google Earth first to Explore the 3-D Building surrounds.

Now explore the Castles and Places:

<http://www.google.com/earth/explore/showcase/3dbuildings.html#tab=castles>

World Skyscrapers:

<http://www.google.com/earth/explore/showcase/3dbuildings.html#tab=skyscrapers>

Art Museums:

<http://www.google.com/earth/explore/showcase/3dbuildings.html#tab=art-museums>

Soccer Stadiums:

<http://www.google.com/earth/explore/showcase/3dbuildings.html#tab=soccer-stadiums>

As you visit each place think about:

1. What questions do you have?
2. Is this a place you may want to travel to one day? Why or Why not?
3. How far do you think this location is from where you live?
4. Can you build a model or draw a picture that represents something you noticed during your tour?

Put your story on the map.

Tour Builder: <https://tourbuilder.withgoogle.com/>

You can create your vacation stories using the Tour Builder. First "view a Tour." Then it's your turn to tell your story using narratives, photos, and a map.

Street Map: <https://www.google.com/maps/views/u/0/streetview?gl=us>

Let's grab a drink, move on, and take some sightseeing tours of the United States.

Make sure your go through the very short tutorial that will allow you to move around the locations you select and as you view the features of the landscape.

Map a Visit to a friend or family member: <https://www.google.com/maps/@34.0225578,-118.2828902,15z>

What about visiting the location of a relative or friend that lives in a different part of the United States, or even in another country? In the "Search" section at the top of your screen enter the

address of your relative including the city and state. If you do not know the address you can view the city and landscapes of your location. Use the “Explore this area” to visit the surrounds. What was interesting?

WHERE IN THE WORLD?



Somewhere in Google Earth is this interesting feature. Can you find it? *Be sure to click the image to the left for a larger view of this location* (<https://sites.google.com/site/sightseerwhereintheworld/>). When you think you've found it, post your answer [here](#).

Here are a few clues to lead you to the location:

- This building opened on August 3rd, 1997.
- It's located in the part of the world where the nights are drawing in.
- The capital city of the country where it is begins with "W."